TAUNTON'S

Fine WoodWorking

Secret to better chiseling, p. 78

Double-duty outfeed table

Clever router jig for box hinges

TOOL TEST

Floor-standing drill presses

Clamping with wedges

Choosing and using Japanese saws

Smart engineering for a pedestal table

Oct. 2015 No. 249

Simple-to-make table also works as a bench, p. 24

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verb: to disrupt, change, transform, shake up

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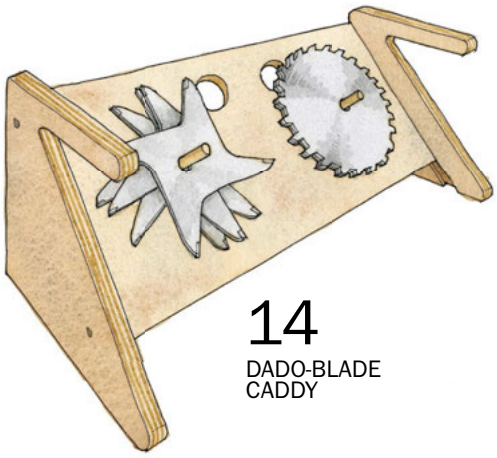

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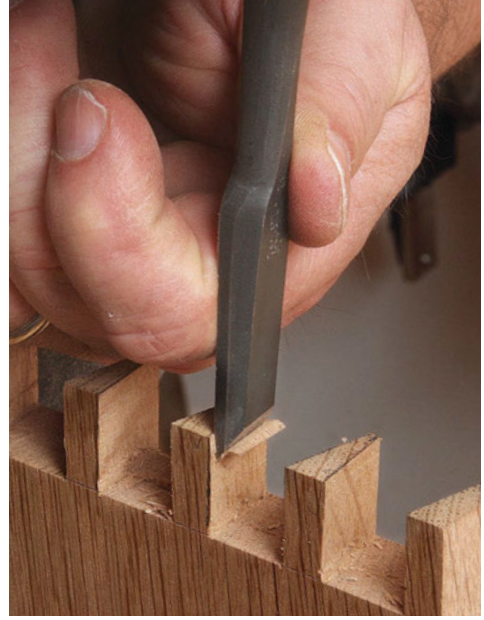
Inspiration for hands-on living®

Cover photo: Matt Kenney



in the back

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THIS MONTH ON FineWoodworking.com/extras

Visit our website to access free online extras, available July 29. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.

Bench-Chisel Basics

Get tips on how to wield this essential workbench companion to your advantage (p. 78).

PODCAST

Modern Master

Professional furniture maker Craig Thibodeau blends a modern aesthetic with old-world marquetry and parquetry techniques. Discover the secrets to his business success in an all-new Shop Talk Live podcast.

High-Power Hinge Jig

When it comes to mounting hinges (p. 70), accuracy is everything. Learn how to build and use a versatile jig for routing dead-on hinge mortises in boxes or cabinets.

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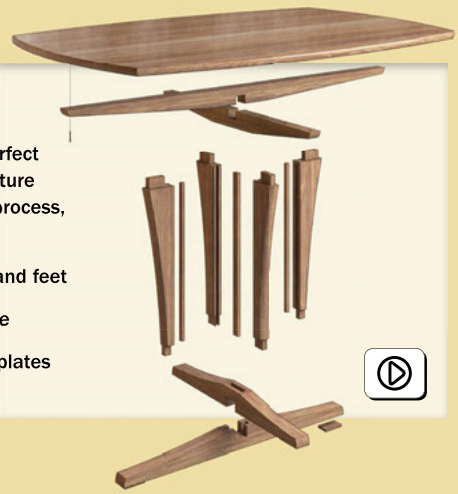

Power of the Pedestal

This pedestal dining table project (p. 38) strikes a perfect balance between elegance and strength. Follow furniture maker Timothy Rousseau through every step of the process, including how to:

- Cut and fit strong half-lapped joinery for the arms and feet
- Use overlapping mortise-and-tenons to join the base
- Add gentle curves to the tabletop using router templates

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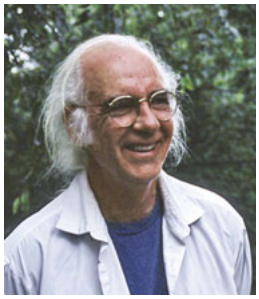
contributors

Usually, the parent feeds the toddler. But in the case of furniture maker Andrew Hunter (“*The Power of the Pull Stroke*”), whose shop and living quarters are both in the house he’s renovating in Accord, N.Y., daughter Ada keeps him fortified with plane shavings. Hunter and his wife, Kate, who helps run a gardening and landscape company, take turns caring for Ada. When he’s not home being a dad or working wood, Hunter can be found high above the net, spiking a volleyball with a local team.

Since graduating from art college more than 20 years ago, **Kelly J. Dunton** (“Outfeed Table Doubles as a Workbench”) has been working simultaneously on building his career as a graphic designer and learning the crafts of woodworking and carpentry. While renovating his second home and first old barn, he’s built an eclectic set of life skills, but designing and building furniture has always been his underlying passion. Dunton designed and built his tablesaw outfeed workbench to better handle the daily rigors of woodworking in a small shop.



When he’s not working in the shop attached to his house in Rhode Island, **Hank Gilpin** (*Designer’s Notebook* and *Back Cover*) can often be found out back tending (or just enjoying) the lush gardens he’s created there. Gilpin and his two assistants crank out dozens of pieces of custom furniture each year, but he also finds time to design and install landscapes and gardens for a range of clients.

Scott Grove (Master Class) designs and makes art furniture and multi-media sculpture. He is a two-time winner of the Veneer Tech Craftsman’s Challenge, and his work is in the permanent collections at the Hunter Museum of American Art in Tennessee and the Memorial Art Gallery in Rochester, N.Y. After running a big commercial shop in Rochester for many years, Grove downsized and moved to a beautiful rural homestead in nearby Canandaigua, where he employs one assistant and works directly with designers and collectors.

For more information on our contributors, go to FineWoodworking.com/authors.

We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

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letters

From the Editor

IN PRAISE OF THE PODCAST

Fine Woodworking's heritage is rooted in one man's passion for woodworking and his vision to convey much-desired information about the craft. That man, Paul Roman, also had the wisdom to get the information not secondhand but straight from the experts.

Our passion for woodworking keeps *Fine Woodworking* moving forward into the 21st century with new ways to complement our print product—such as lively blogs and in-depth videos—all of which teach and inspire. And there's a new information player in the game, built on the same passion and creativity that launched *Fine Woodworking* almost 40 years ago: our podcast, Shop Talk Live.

What started out in March 2012 as a fun venture, a way to have a lively conversation about woodworking, has blossomed. This year the number of downloads reached 1 million, with an average of 45,000 per month. Those are significant numbers, a signal that our audience is well-engaged and hungry to take part in the ever-expanding online feast served up by *Fine Woodworking*.

In our efforts to convey serious information about furniture making in print and online, we sometimes seem, well, too serious. But the podcast brings authors and editors from behind the curtain, and lets both hosts and guests chill out and have some serious fun.

Although everyone on the staff has participated in Shop Talk Live, Ed Pirnik, Mike Pekovich, and Matt Kenney have been there from the start and are the mainstays of the show. Their energy, woodworking knowledge, and personalities have shaped the podcast into what it is today—an entertaining way for listeners to get to know our staff and authors, to get solid answers to woodworking questions, and to hear some witty banter about hard-to-admit mistakes and regrettable tool purchases. It's wonderful.

SHOP TALK LIVE℠

I want to thank those three guys, and everyone else who has helped with the show, for morphing it into a core piece of *Fine Woodworking*. They do it despite overwhelming daily workloads. They do it because they love woodworking. And it shows.

Shop Talk Live episodes happen every two weeks. You can access the show via FineWoodworking.com, or get it on iTunes and iHeartRadio. Check it out. You won't be disappointed.

—Tom McKenna

Lifetime of work

I am 79 years old. My enthusiasm for making sawdust goes back to about 1950 and has continued.

After retiring from a nomadic aerospace career, I was able to devote more effort to making some original home furnishings. Your publication was a large part of my inspiration as well as my technical guide. So, though I am certain that my work is hardly worthy of gracing the pages of your publication, I wish to share a few small photographs of my most recent projects. They probably constitute my swan song as a woodworker because infirmity has pretty well taken over my mortal frame. They do not represent anything close to all of my output. I hope that you can feel a small amount of pride for having provided my inspiration and guidance. Thank you very much.

—ROLAND H. NORTON,
Owens Cross Roads, Al.

Woodworking sisters in Celina

My sister and I live together in a small apartment. We have a full line of hand tools, an electric drill, and a Fat Max saw. But we are so crowded in our apartment, I have to buy only short boards at Menards. Our joy is grand when we find a very special white pine board with lovely grain, so you can imagine how we gasp seeing these finer wood furniture pieces in *Fine Woodworking*! I am 70 and my sister is 66, and we've not been carpentering long, just over two years.

We have fun using what we have here and what we buy from local hardware stores. I've made a cabinet with a door and another with just shelves. The cabinet leans (my faulty measuring) but the shelves are straight. I've also made a pulpit-size workbench that locks together with tie-downs, and a door under it for a brace. It is very "unique," and the retired carpenter across the hall, methinks, rolls his eyes a lot.

—SUE HESS, Celina, Ohio

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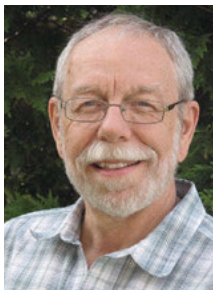
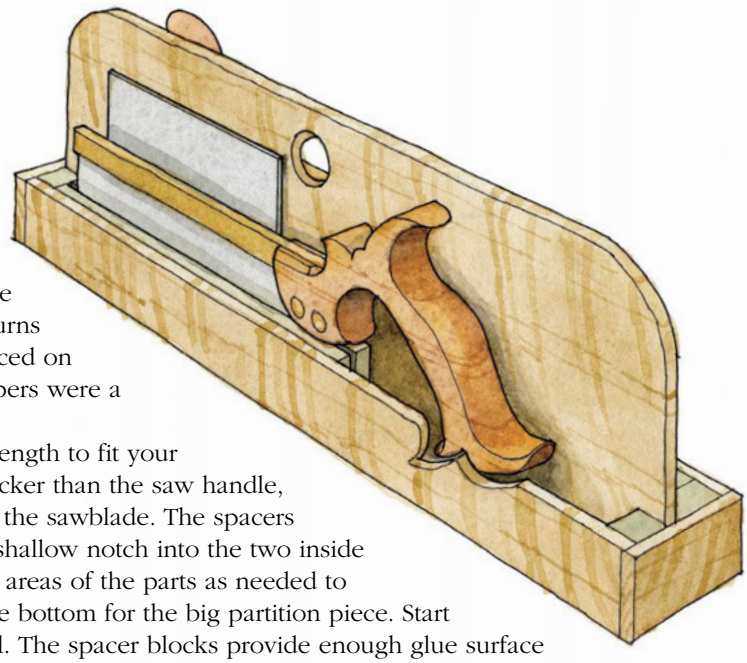
EDITED AND DRAWN BY JIM RICHEY

Best Tip

Easy-to-make tote for backsaws



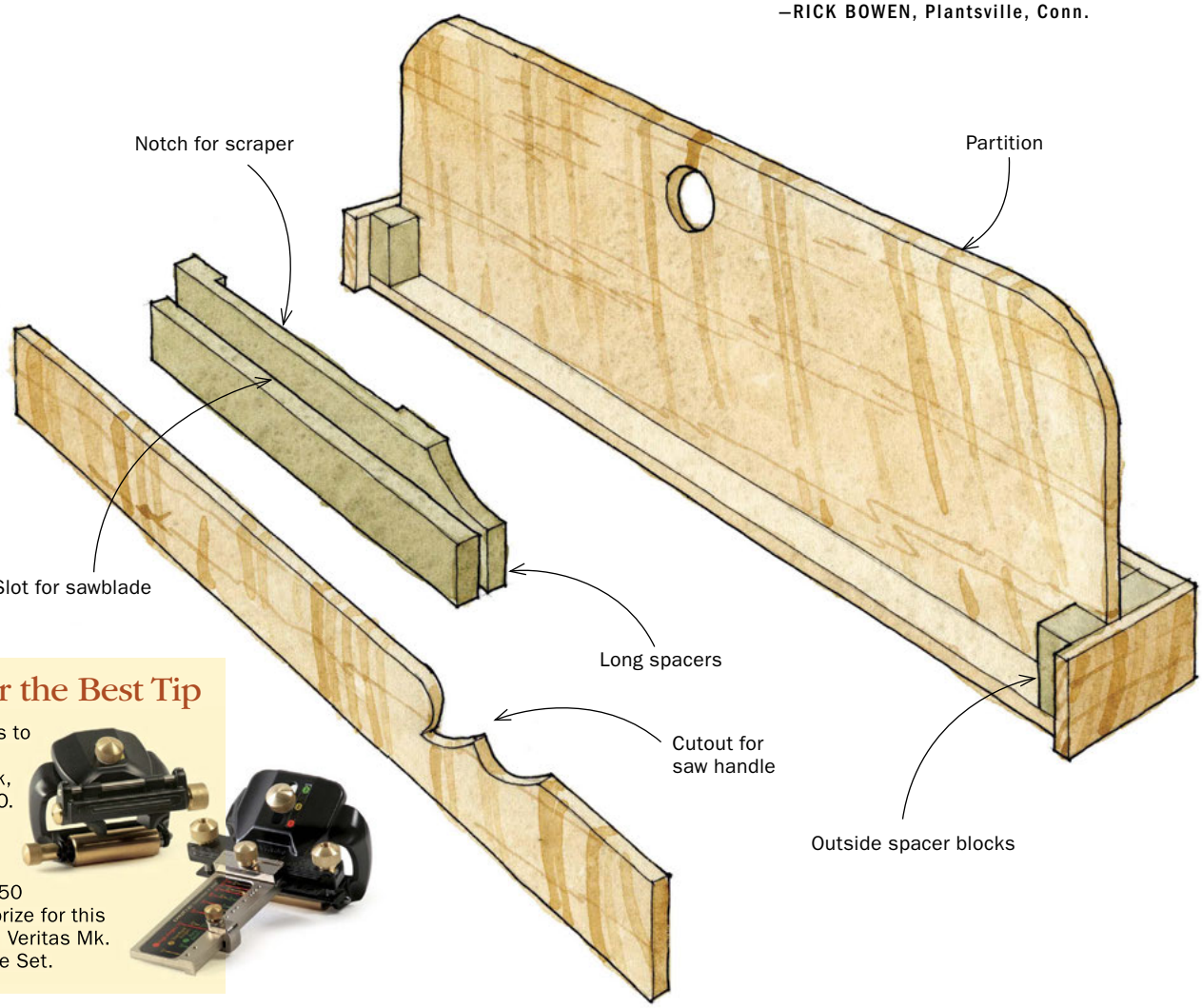
With a professional home builder as a father, Rick Bowen has sawdust in his blood. He has been reading *FWW* since issue #1, and credits Christian Becksvoort for his love of the Shaker style. Now retired from a career as a respiratory therapist, Bowen has more time to devote to furniture making, which he prefers to do with hand tools when possible. His latest project is a cupboard-on-chest.



I came up with this two-sided till to protect the backsaw and dovetail saw in my tool chest. Turns out it does the same when pulled out and placed on the workbench. The pockets for the card scrapers were a useful afterthought.

Start by cutting the primary components to length to fit your saws. Plane the outside spacer blocks a bit thicker than the saw handle, and size the long spacers to provide a slot for the sawblade. The spacers are about 3/32 in. thick in my case. Then cut a shallow notch into the two inside spacers to receive the card scrapers. Cut away areas of the parts as needed to accommodate the saw handles, and groove the bottom for the big partition piece. Start with that groove joint when assembling the till. The spacer blocks provide enough glue surface to hold the rest of the parts together.

—RICK BOWEN, Plantsville, Conn.



A Reward for the Best Tip

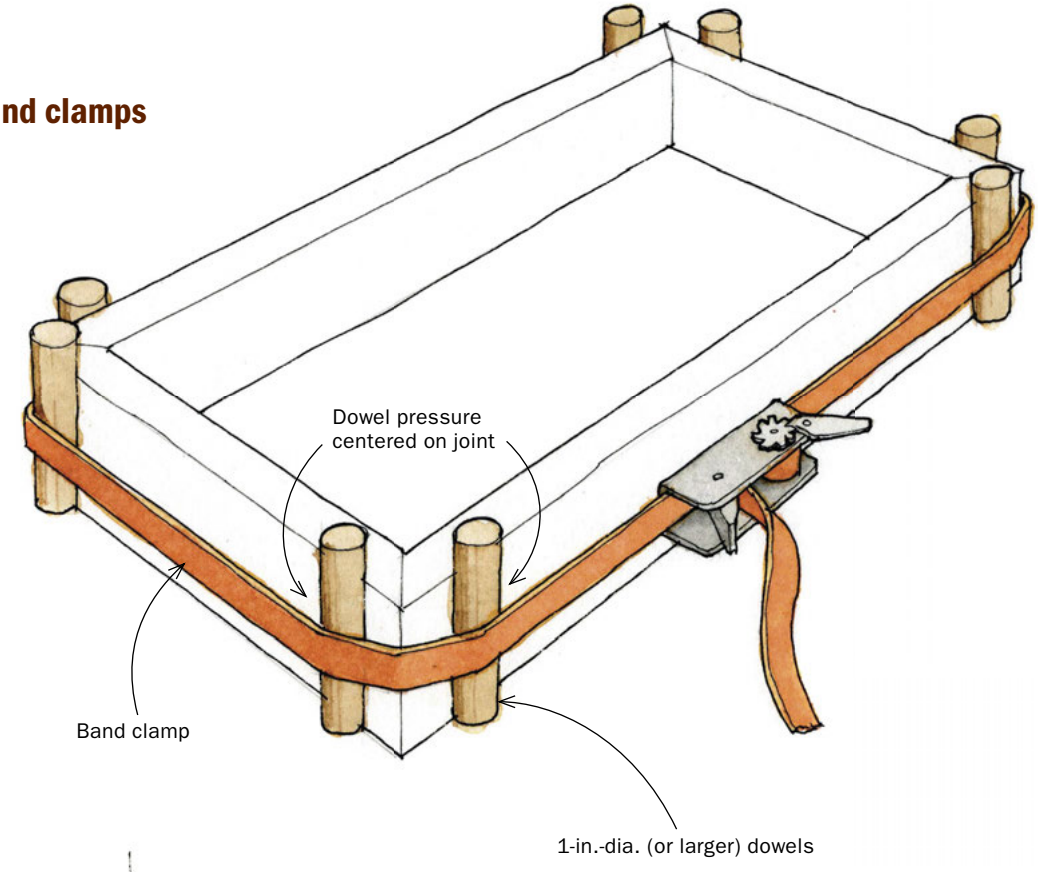
Send your original tips to fwmow@taunton.com or to Methods of Work, Fine Woodworking, P. O. Box 5506, Newtown, CT 06470. We pay $100 for a published tip with illustration; $50 for one without. The prize for this issue's best tip was a Veritas Mk. II Deluxe Honing Guide Set.

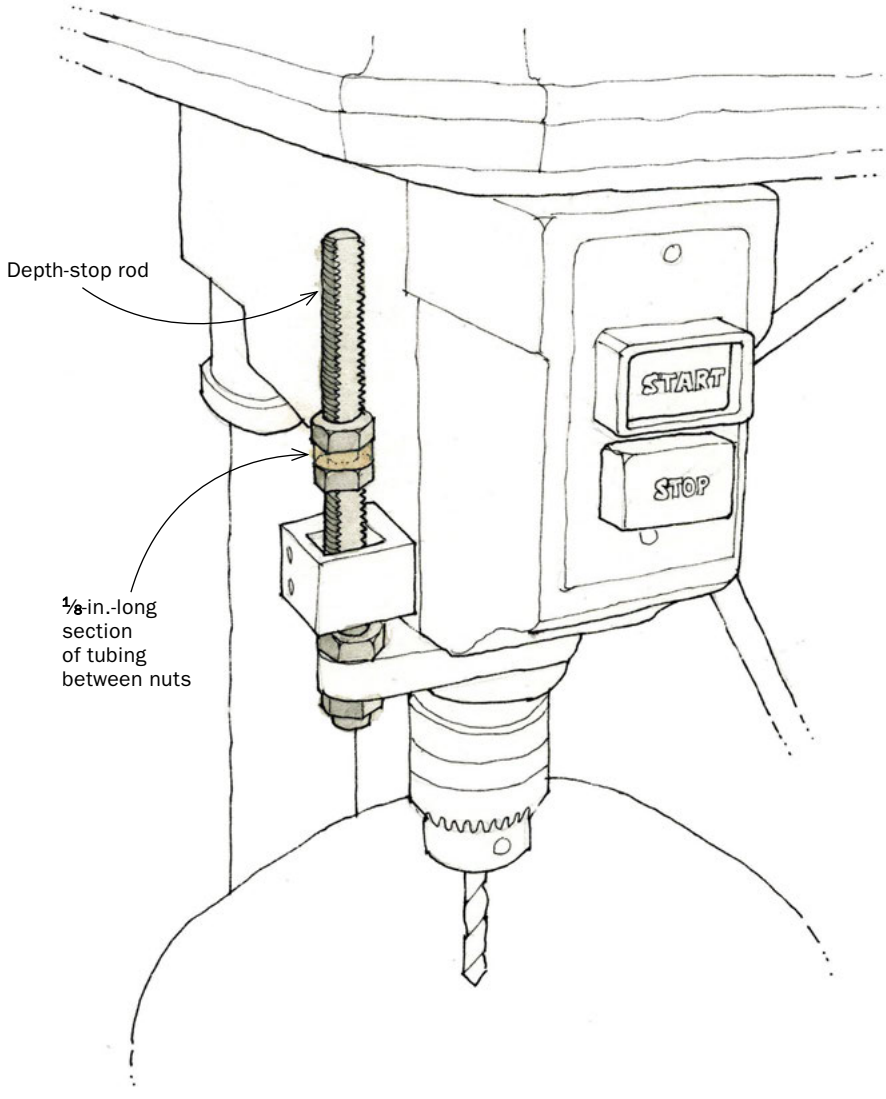
Dowels focus pressure from band clamps

I like the way a band clamp pulls four miter joints together all at once. The problem is that the pressure from the strap is not focused directly across the miter joints. The strap can also mar the corners. I've tried the corner brackets available for band clamps, but I like the following method better.

Partially tighten the strap, and then insert two dowels under it near each corner. Push or roll each dowel toward the joints, pinpointing the direction of the clamping force. Tighten the strap if needed. This fix costs the price of a dowel and works great.

—PETER LOKKEN, Chicago





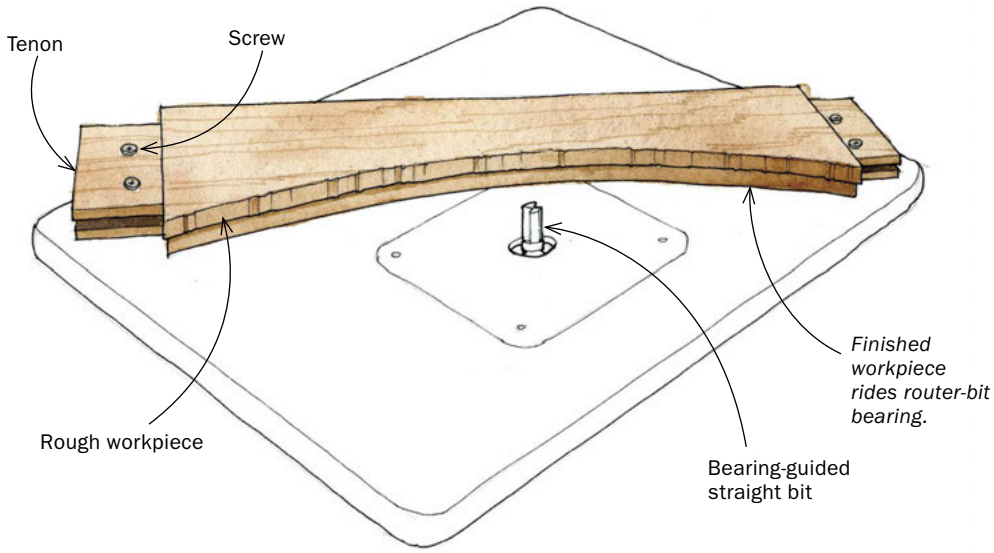
Cushioned depth stop for drill press

Most drill presses have a depth stop that uses two jam nuts on a threaded rod. This works fine, but it requires two wrenches to make adjustments.

An easier and faster way to make and keep these adjustments is to make a soft washer by cutting a ⅛-in. ring from a piece of vinyl tubing and mounting it on the stop rod between the jam nuts. Now finger-tighten the nuts together, and the compressed vinyl will act like a lock washer, keeping the nuts securely where you want them. Loosen it the same way—no tools required.

Use a tubing diameter that slides easily over the rod, but fits closely. In my case, a piece of ⅜-in. inside-diameter tubing fits nicely over a 10mm stop rod. If your drill-press stop rod is ⅝ in. diameter, you can use a common hose washer.

—JOHN CUSIMANO, Lansdale, Pa.

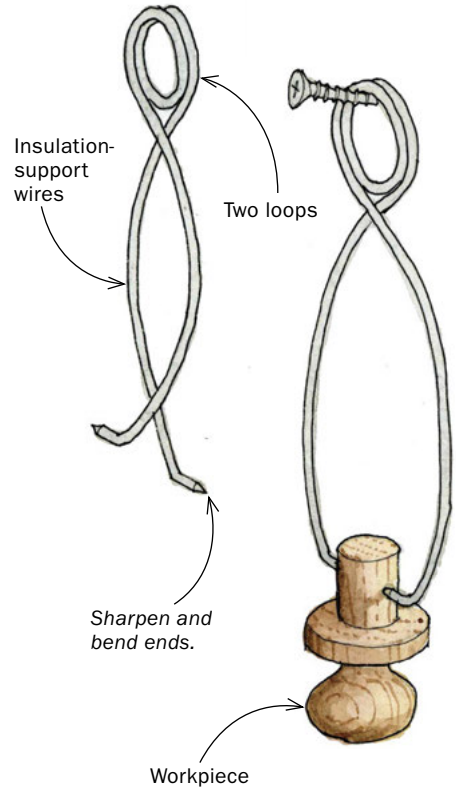


Use workpiece as a router template

I frequently need to mill a subtle curved arch on the underside of lower rails for dressers, nightstands, and sideboards. If I have only a few pieces to cut, it's not really worth the time to make a reusable router template with toggle clamps. Instead, I bandsaw and sand one workpiece to final shape, and then use it as the template for routing the others.

First I trace the finished curve onto the other parts and bandsaw their curves close to the line. Then I screw the rough workpieces to the finished one for routing. I locate the screws in the tenons, where the holes will be hidden later. To rout the curves, I use a bearing-guided straight bit. Be careful when engaging the bearing at the beginning of the cut.

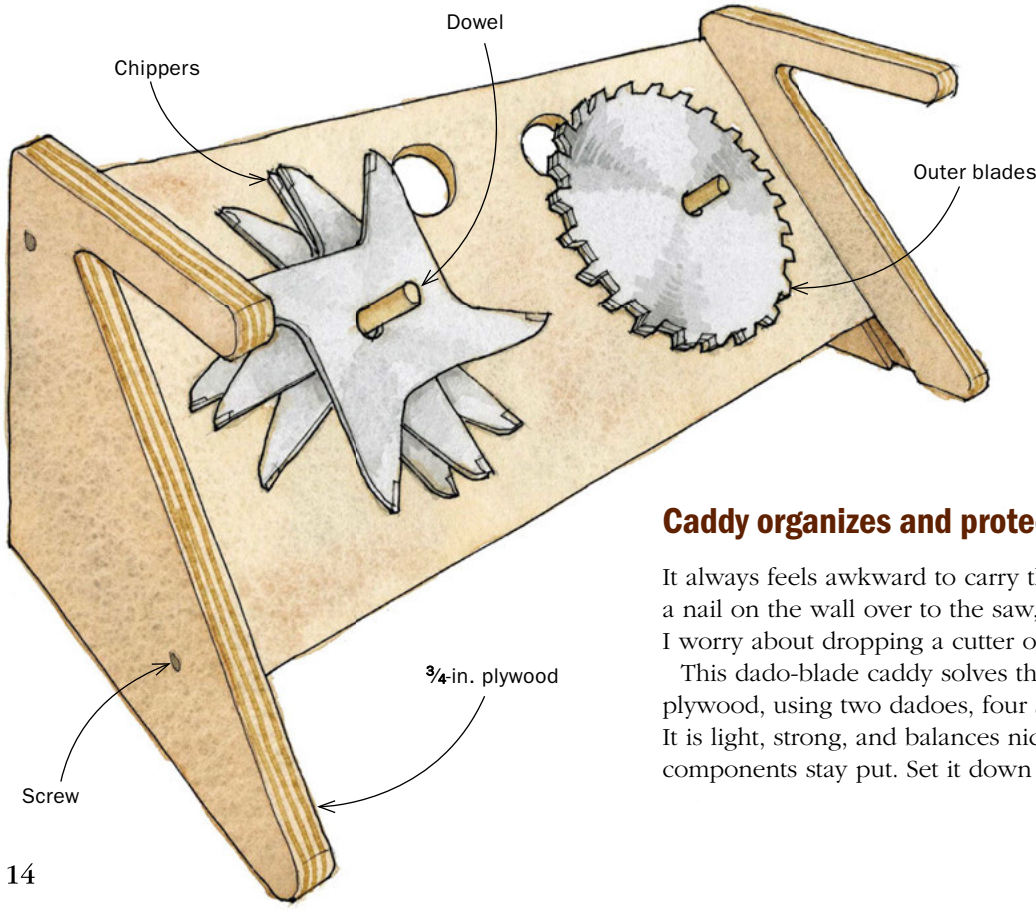
—WILLIE SANDRY, Camas, Wash.



Spring-action holders for finishing

I make these simple spring clamps to hold small parts for finishing and to hang them up to dry. They are made from insulation support wires (stiff steel wires used to hold fiberglass insulation between ceiling joists). Wrap the wire around a bar or dowel to make two loops. Then sharpen the ends and bend the last ¼ in. horizontal.

—JIM FONTENOT, Macon, Ga.



Caddy organizes and protects dado set

It always feels awkward to carry the multiple parts of my dado set from a nail on the wall over to the saw, plunking them down on the cast iron. I worry about dropping a cutter on my toe or damaging a carbide tooth.

This dado-blade caddy solves the problem. I made it from scrap plywood, using two dadoes, four screws, a couple of dowels, and glue. It is light, strong, and balances nicely. Pick it up by the handles and the components stay put. Set it down and they are easy to access.

—JEFFREY KUSAMA-HINTE, Brooklyn, N.Y.

MACHINES

Mobile saw is at home in the shop

ALTHOUGH IT'S DESIGNED FOR THE CONSTRUCTION INDUSTRY, I took SawStop's new job-site saw into my shop and tested it to see if it would pass muster as a furniture-making tool.

The saw can be folded up and set against a wall, taking up very little space. The collapsible stand is outfitted with wheels, making it easy to move. The saw has convenient onboard storage for the fence, miter gauge, spare blade, spare brake cartridge, and wrenches—it even has a spot for a tape measure.

The 15-amp universal motor had ample power. It handled ¾-in.-wide dadoes without any trouble, and I was able to rip 8/4 hard maple (although I did have to slow the feed rate). The cabinet has a 2½-in.-dia. dust port connected to a shroud around the blade. Hooked to a shop vacuum, the saw did a very good job capturing chips and dust, especially with the blade guard in place.

Blade adjustments were easy. One turn of the height-adjustment wheel takes the blade from below the table to full height. Despite this quickness, it was easy to fine-tune the blade's height. Angling the blade was just as fast. A quick release on the height-adjustment wheel allows you to tilt the blade in 1° increments, and there is a separate wheel for microadjustments of the angle.

I do have a few complaints. The motor is loud. I measured the noise level at 100 db. from 3 ft. in front of the saw, and slightly higher from behind it. The saw's table is small. There is only 6 in. of table in front of the blade, which makes crosscutting with a miter gauge tricky. And speaking of the miter gauge, I'd replace it with a larger and more sturdy aftermarket one right away.

Overall, despite the complaints, it's a solid little saw, ideal for furniture makers with small shops or those who need to pack away their shops when not in use.

—Kelly J. Dunton is a woodworker in Terryville, Conn.

Plenty of power for a dado set. *With a ¾-in.-wide dado stack on the arbor, the saw easily cut dadoes and tenons.*

Super-fast height adjustment. *One turn of the handle brings the blade to full height, but there is still enough finesse in the mechanism to fine-tune the height for precise work.*

Great dust collection. *With a shop vacuum hooked up and the blade guard in place, the saw collected just about all of the dust and chips created.*

Photos, except where noted: staff; opposite page, bottom right: Mario Rodriguez

■ HAND TOOLS

Honing guide made for chisels

A sure grip. *The Veritas Mk. II narrow-blade honing guide squeezes tough-to-grip chisels between two sliding jaws.*

FOR YEARS I'VE RELIED ON HONING GUIDES to help sharpen my hand tools. But many honing guides have a hard time gripping chisels—especially short or narrow chisels, and those with square sidewalls. So when Veritas introduced the Mk. II narrow-blade honing guide, I was eager to see if it could tackle my tough-to-sharpen chisels.

The narrow guide is identical to the original Mk. II standard honing guide, except for the clamping head that holds the blade. While the standard guide uses a head that clamps a blade (from ½ in. to 2⅞ in. wide) tightly between two horizontal bars, the narrow guide pinches the blade (from ⅛ in. to 1½ in. wide) between two sliding jaws.

I started my evaluation with a short-bladed chisel. The jaws held the chisel securely and made honing a breeze. From there I tried a wide chisel, followed by a square-walled chisel. The guide gripped them all with ease. Finally, I pulled out my worst offender, a ⅛-in.-wide dovetail chisel, whose size and narrow profile make it impossible to hold securely in most honing guides. As with the other chisels, it clamped up tight, and I was able to hone a square, sharp edge on that nasty little tool for the first time ever.

The Mk. II narrow honing guide is a great addition to my sharpening kit. The set includes the clamp head, roller base, and registration jig. But if you already own the standard Mk. II, you can simply add the narrow clamping head to that set for $49. If you don't own a honing guide, I'd recommend springing for the Mk. II Deluxe Honing Guide set ($119), which includes both clamping head styles, plus straight and cambered rollers.

—Michael Pekovich is FWW's executive art director.

Narrow-blade honing guide by Veritas

$85

Dovetail jig by Leigh

Model RTJ400

$329

■ ACCESSORIES

Easy-to-use dovetail jig

DOVETAILS HAVE LONG BEEN A SIGN of quality and fine craftsmanship. However, cutting beautiful dovetails by hand requires long hours of practice, a commitment many woodworkers are unable to make. Hence, the popularity of jigs and fixtures that guide a router to cut dovetails.

Most jigs are designed around templates that guide a handheld router in a specific pattern. Leigh's new RTJ400 is different. Used with a router table, the jig makes it easier to adjust the joint's fit. The key to its simplicity is an eccentric bushing that's mounted in the table's throat plate. Instead of fiddling with the bit or template, as you must do with other jigs, simply rotate the bushing to either tighten or loosen the fit of the dovetails. I made one small adjustment to the bushing and got perfect through- and half-blind dovetails.

On the downside, like other jigs, the RTJ400 provides only a single dovetail pattern, and workpiece dimensions sometimes must be modified to use the jig. Nonetheless, the Leigh RTJ400 is very effective jig for cutting dovetails with a router.

—Mario Rodriguez teaches at Philadelphia Furniture Workshop.

Dovetails on the router table. *The Leigh RTJ400 is used with a table-mounted router, which makes for stable and quick dovetailing.*

■ SHARPENING

Grind great bevels for less

I'VE OWNED A TORMEK S-2000—an earlier version of the company's T-7 model—for years and I'd be lost without it. While advertised as a one-stop sharpening system, I actually use mine for a single task, grinding a bevel.

Though you can do the job quickly on a standard grinder, you run the risk of burning the cutting edge and producing uneven, scalloped bevels. But with its slow-running, water-cooled wheel and easily adjusted tool holder, the Tormek is the perfect tool for safely grinding an accurate bevel on edge tools.

The downside to the Tormek T-7 has always been its high price. The good news is that a new version of its smaller and less expensive brother, the T-4, works just as well. The T-4 has an 8-in. wheel (the T-7 has a 10-in. wheel), a plastic stand, and a slightly less powerful motor. In use, I didn't notice the difference in motors, but the smaller footprint made the T-4 a little tippy. To stabilize the machine, I removed the rubber feet and clamped it to my bench. The company also offers a number of accessories for sharpening everything from turning tools to scissors to axes. If you plan on sticking to chisels and plane irons, you'll need the diamond wheel dresser (TT-50, $90) and the square edge jig (SE-76, $60, shown at right).

—M.P.

■ ACCESSORIES

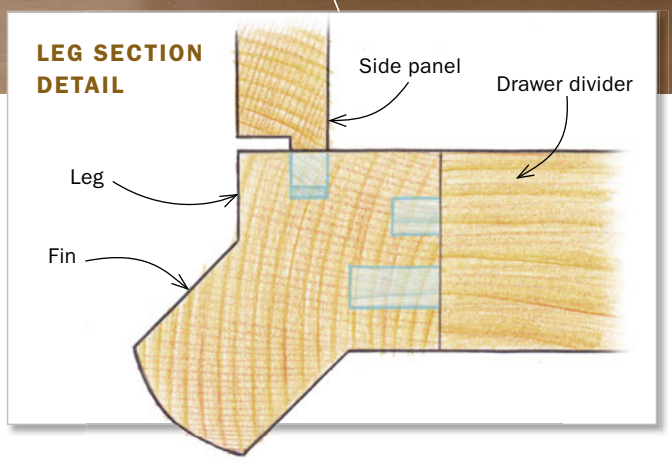
Dust-collection hose that fits small power tools

Perfect connection. *Rockler's new dust hose not only fits snugly onto many small tools, but it also pivots during use, making dust collection hassle-free.*

I ALWAYS CONNECT MY SHOP VACUUM to my random-orbit sander. With today's perforated sanding disks, the vacuum pulls the dust right off the wood, keeping the sandpaper and, more importantly, my nose and lungs clear. What I don't love is wrestling with the combination of duct tape and hose adapter that I use to connect the vacuum to the back of the sander. It is hard to put the adapter on in the first place, and then it pops off in use.

Rockler solved this problem with its Universal Small Port Hose Kit, part of the Dust Right system. I'm a fan of the Dust Right collapsible hoses, and the one on this accessory expands from 3 ft. to 15 ft. At one end is the standard 2¼-in. (outside diameter) fitting that plugs into all shop vacuums except the Festool. At the other end, you thread on one of two rubber ports, one at 1-in. inside diameter and the other at 1½ in. Each is flexible and ribbed inside for a firm grip. The larger port seamlessly fit my two Porter-Cable sanders. The smaller one fit a Festool Domino perfectly, meaning it will fit the whole Festool family of tools. While neither port was perfect for the Ryobi and Ridgid sanders in our shop, the larger one worked great with a few wraps of duct tape over each tool's port. It might be a good idea measure the ports on your tools to see if they are close to a 1 in. or 1½ in. outside diameter.

—Asa Christiana is the special projects editor.



The Gilpinoid leg

ADAPTABLE LEG GIVES CASEWORK THE DISTINCTIVE MARK OF ITS MAKER

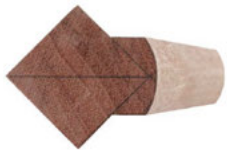
BY HANK GILPIN

Photos: Jonathan Binzen

One day long ago, while designing a desk, I watched my very energetic 2-year-old son racing through the house, his head at tabletop level. The furniture suddenly seemed to be bristling with pointy corners and sharp edges, each one of them inviting him to a perilous head-meets-corner moment. The potential for serious bruising got me thinking, and before long I had designed a leg for the desk that combined a traditional square post with a fin-like projection on the outer corner that I could round off to eliminate the sharp angle. The section of the new leg was an odd shape—I believe the geometric term for it is the seven-sided Gilpinoid. Structurally, the leg functioned just like a plain square leg, but the fin gave me all sorts of decorative options.

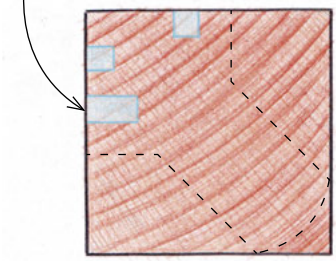
I realized I could taper the fin so it projected less at the top than at the bottom, giving the leg a bit of a graceful lift and leaving enough width at the bottom to make a shapely, scalloped foot. Where the desktop projected over the top of the leg, I designed a turret corner, which echoed the shape of the leg while eliminating more head-whacking right angles.

My first thought was to glue up the finned leg from two or three smaller pieces. But in the end I chose to cut it entirely from a single thick blank. A bit wasteful, perhaps, but a cool way to make a complex shape, working by subtraction like a

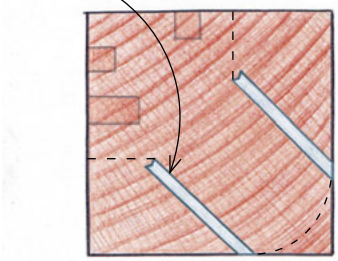


MAKING THE FINNED LEG

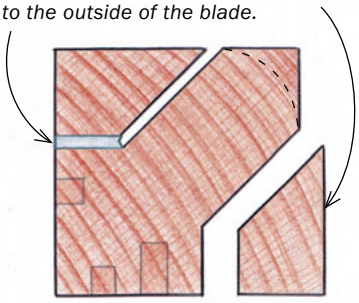
1. First, with the blank milled square, cut mortises for the frame rails and drawer dividers, and cut grooves for panels.



2. On the tablesaw, with the blade angled at 45°, make two ripcuts to define the sides of the fin.



3. On the tablesaw, with the blade at 90°, make two ripcuts to define the square section of the leg. Be sure the waste piece falls to the outside of the blade.



sculptor with a block of marble. I do like to create interesting shapes that make you wonder, "How was this made?" Making it this way also results in perfect continuity of grain and color.

The leg worked well on the desk, so I used it on a cabinet. And another. Then another. My son is 30 now. In the years since he learned to maneuver safely around furniture, I've used the leg on scores of pieces, everything from diminutive jewelry boxes to 8-ft.-tall armoires.

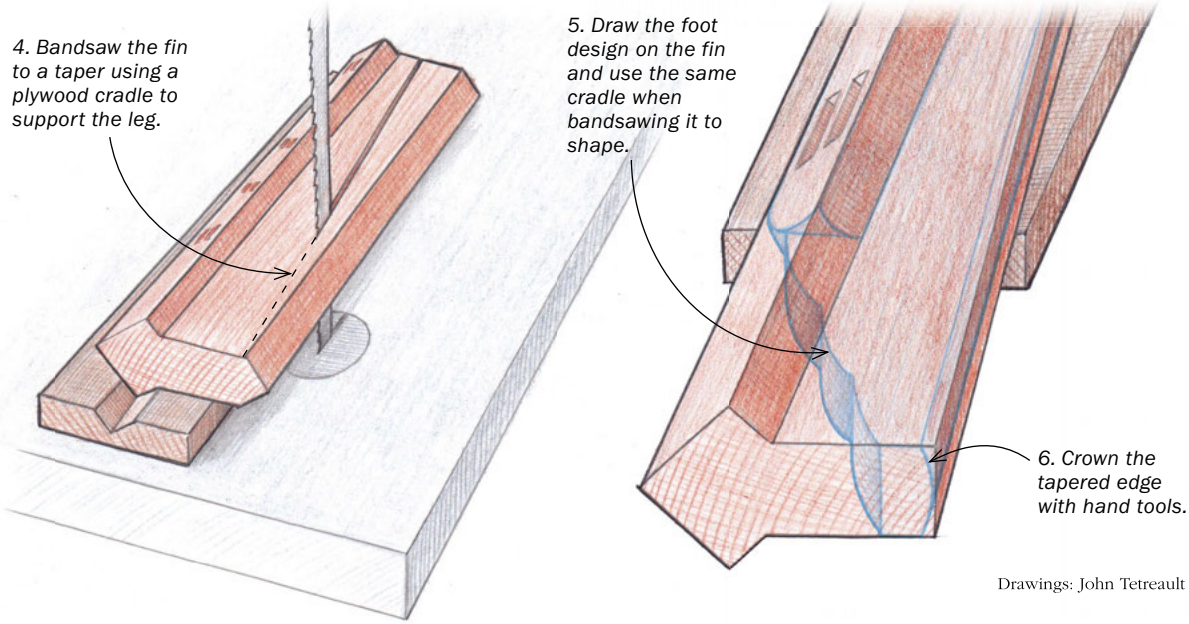
Like the cabriole leg, which craftsmen adapted to footstools and highboys, dining chairs and writing desks, this finned leg was extremely versatile. And it allowed me, in a funny way, to be imaginative in a limited context, keeping things fresh without requiring that I reinvent the wheel every day. □

Hank Gilpin builds custom furniture in Lincoln, R.I.

4. Bandsaw the fin to a taper using a plywood cradle to support the leg.

5. Draw the foot design on the fin and use the same cradle when bandsawing it to shape.

6. Crown the tapered edge with hand tools.



Drawings: John Tetreault

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Taunton

Photos: Matt Kenney

Outfeed Table Doubles as a Workbench

With a big top and vise, this easy-to-build table gives you more space to work

BY KELLY J. DUNTON

I have a small shop on the second story of a barn. When I needed a new outfeed table for my tablesaw, I saw it as a chance to squeeze one more work surface into the small space. So I designed the outfeed table to double as a workbench. Made entirely of soft maple, the table has a hefty top with a large cast-iron vise. Mortise-and-tenon joinery, along with a few bridle joints, makes for a rigid base. Construction is not difficult. I'll show you how to build this table from the bottom to the top.

Make the base

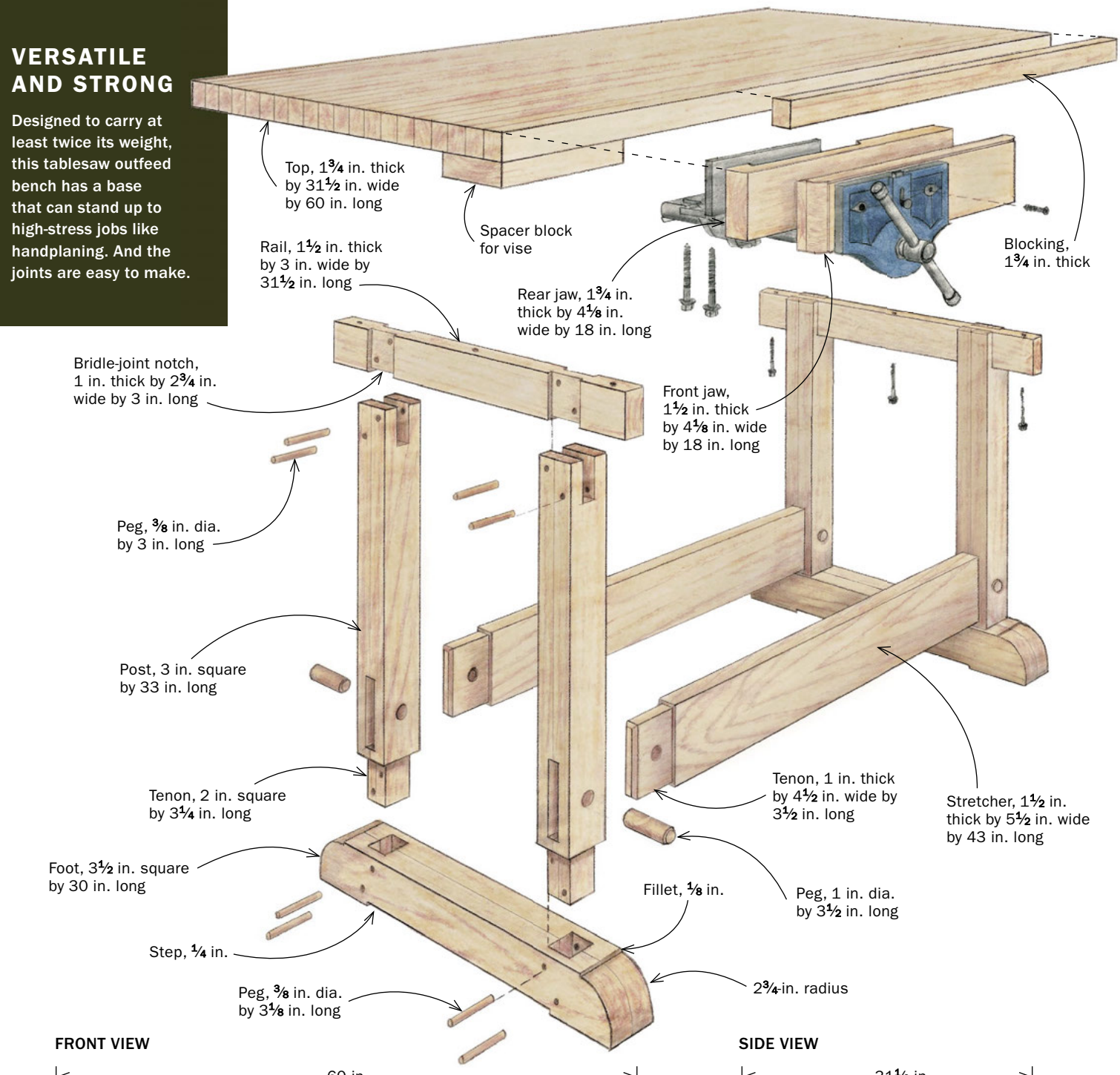
Regardless of the technique you use (mortiser, router, or drill press and chisel), deep through-mortises like those in the trestle feet and posts of this table can be difficult to make. I get around all that work by cutting the mortises on the tablesaw.

Here's the wizardry behind my method. The feet and posts are made by gluing two pieces together, so I cut the joinery before assembling these parts. Start with the stretcher mortises in the posts. Mill the two halves of the post to their final dimensions. You only have to lay out the mortise location on one half of the post. Stop blocks on a miter gauge guide the work from there.

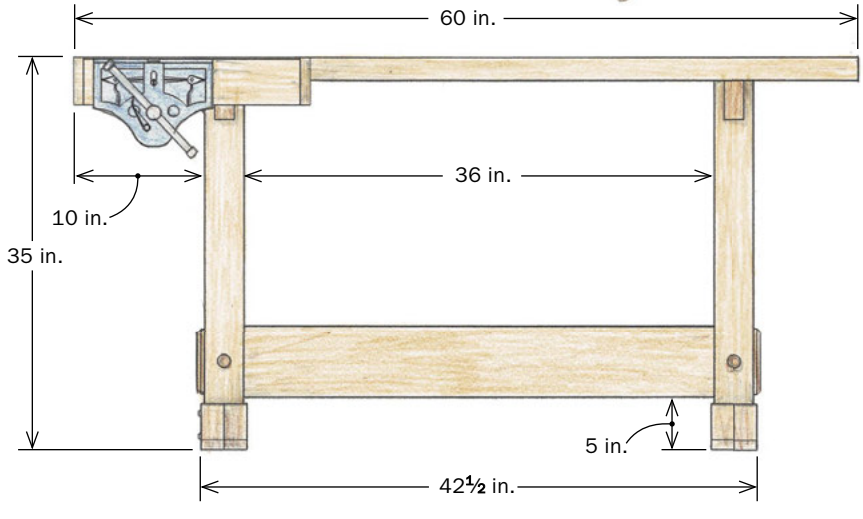
Put a dado set in your tablesaw—a ¾-in.-wide stack works well. Now attach a long auxiliary fence to your miter gauge. You'll need two stop blocks to control the mortise's width and location. To set the stop blocks, place the workpiece against this auxiliary fence and slide it to the right so that

VERSATILE AND STRONG

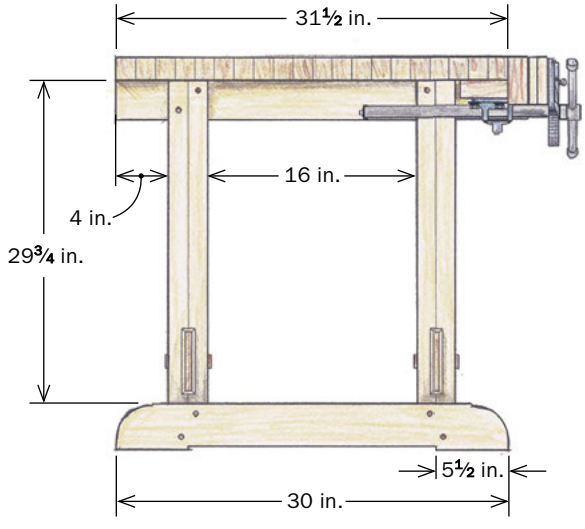
Designed to carry at least twice its weight, this tablesaw outfeed bench has a base that can stand up to high-stress jobs like handplaning. And the joints are easy to make.



FRONT VIEW



SIDE VIEW



BIG TOP, LESS WORK

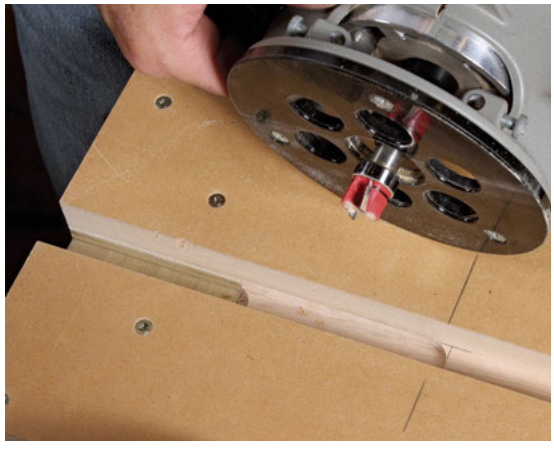
Glue up the top in sections small enough to joint and plane, then glue those sections together to complete the top.

Square up, then glue up. *After jointing a face, run the sections through the planer (above), then joint the edges square to the faces. A caul across the width and clamps over the gluelines at the ends keep the three sections aligned (left).*

the left end of the mortise is aligned with the left side of the dado set. Clamp the block to the fence, snug against the right end of the post half. Slide the post back to the left until the right end of the mortise aligns with the right side of the dado set. Clamp the other stop block to the fence, tight against the left end of the post.

Cut one end of the mortise. Slide the post half against the other stop and cut the other end. Cut away the waste between these two cuts with the dado set. Repeat the process for the remaining mortises.

To keep the post halves properly aligned during the glue-up, I put a filler block in the mortise. It should be the same thickness and width as the mortise, but make it several inches



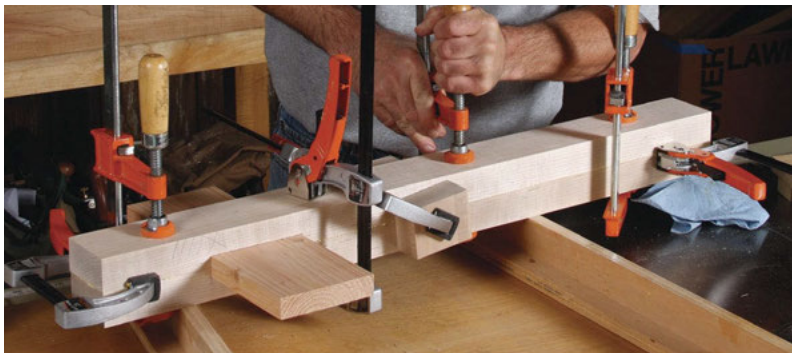
Rout clearance slots. *At 5 in. to 6 in. long (depending on the miter gauge you use) and just wider than the slots in your saw's table, these give miter bars a place to go so that workpieces can clear the back of the blade.*

Drawings: Kelly J. Dunton

CUT MORTISES AT THE TABLESAW

Gluing up the posts from two pieces of thinner stock allows you to cut the deep stretcher mortises at the tablesaw—a nifty trick.

Do the ends first. *Stop blocks on the miter gauge fence ensure that the mortise's length and location will be the same on every post half. Hog out the waste between the ends (right). The ¾-in.-wide dado set eats through the meat of the mortise in just a few passes.*



Clamp the halves together. *A filler block in the mortise keeps the halves properly aligned, while a set of cauls keeps them aligned side to side. After the clamps are set, knock out the filler block.*

Cut the tenons next. *A stop block determines the length.*

longer so that you can knock it out after clamping the halves together. Don't leave it in while the glue dries.

Next up is the bridle joint at the top of each post that houses the rail. Start at the bandsaw, cutting the cheeks and removing as much waste as you can with diagonal cuts down to the bottom corners. Clean up the remaining waste with a chisel.

Now make the feet. They also need mortises for the post tenons. Make them the same way as the stretcher mortises in the posts—on the tablesaw, before gluing the halves together. After gluing up the feet, cut their profile at the bandsaw.

Now you're ready to drill all of the peg holes at the drill press. Most Forstner bits are too short to make it all the way through the posts and feet, so use a brad-point bit instead. Also, slide the filler block that you used to align the mortises during the glue-up back into the mortise before you drill the hole. This prevents the bit from blowing out the grain inside the mortise.

With all of the mortises completed, begin the tenons. I cut all of the tenons at the tablesaw with a dado set and miter gauge, using a stop block to ensure consistent shoulders. I do the tenons at the bottom of the posts first.

Next up are the stretchers and rails. The stretchers have through-tenons that stick out ½ in. beyond the post. After

BRIDLE JOINTS FOR THE TRESTLE RAILS

The rails are long enough to support the top out to its edges.

Cut the cheeks first. *Set the fence to cut the cheek nearest to it. Flip the post over to make the second cheek cut to center the joint.*

Clean out the waste, too. *The bandsaw handles most of it, but you'll need to pare the baseline with a chisel.*

Notch the stretchers. *Use two stop blocks to control the notch's location and length. Leave the joint a bit thick, so you can plane it to fit the open mortise in the post.*

fitting the tenons, cut them to length and chamfer the ends with a block plane.

The end rails are notched on both faces to fit into the bridle joints. Cut the notches with a dado set. After fitting the joints, I chamfer the ends of the rails with a block plane.

No clamps needed for assembly

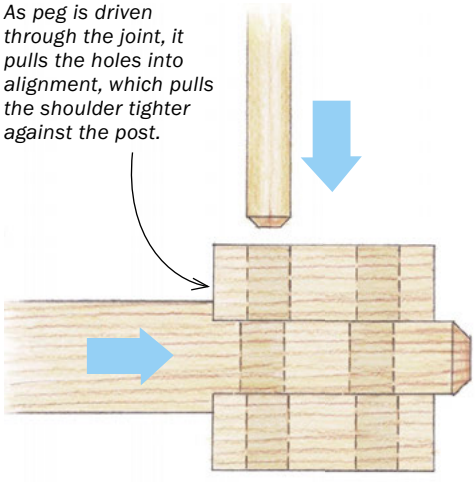
Now that all of the joinery is cut, you can assemble the base. Start with the trestle ends. Its joints are glued, but they are also drawbored—including the bridle joints—to ensure that the tenon shoulder is pulled tight. To set up the joint for drawboring, dry-fit the tenon in the mortise. Now grab the bit you used to drill the peg holes. Slip it into the hole and give it a light tap, just enough to mark the tenon. Pull apart the joint and use the punch to offset the mark about 1/32 in. closer to the shoulder. Drill a hole through the tenon at this new mark.

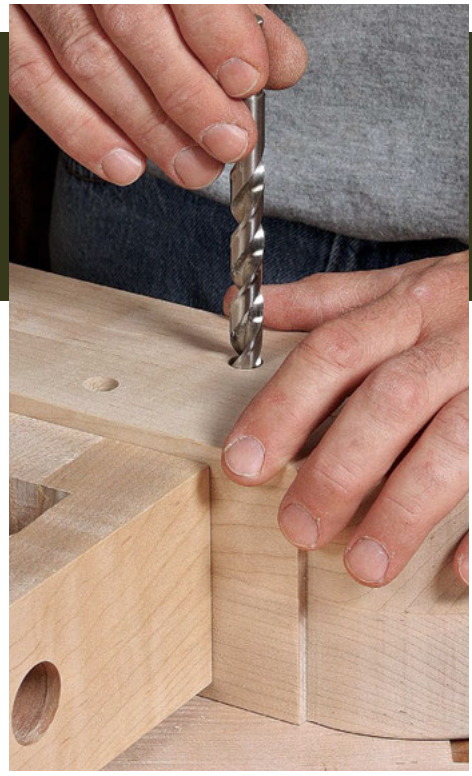
Spread glue on the joint, insert the tenon, and drive the peg into the hole. As it passes through the hole, the peg forces the tenon

DRAWBORE THE JOINTS

The big advantage of the drawbored joint is that the peg pulls the tenon shoulders tight to the posts, helping to create a rigid and strong assembly without the need for clamps.

DRAWBORE PEG CREATES A SEAMLESS JOINT





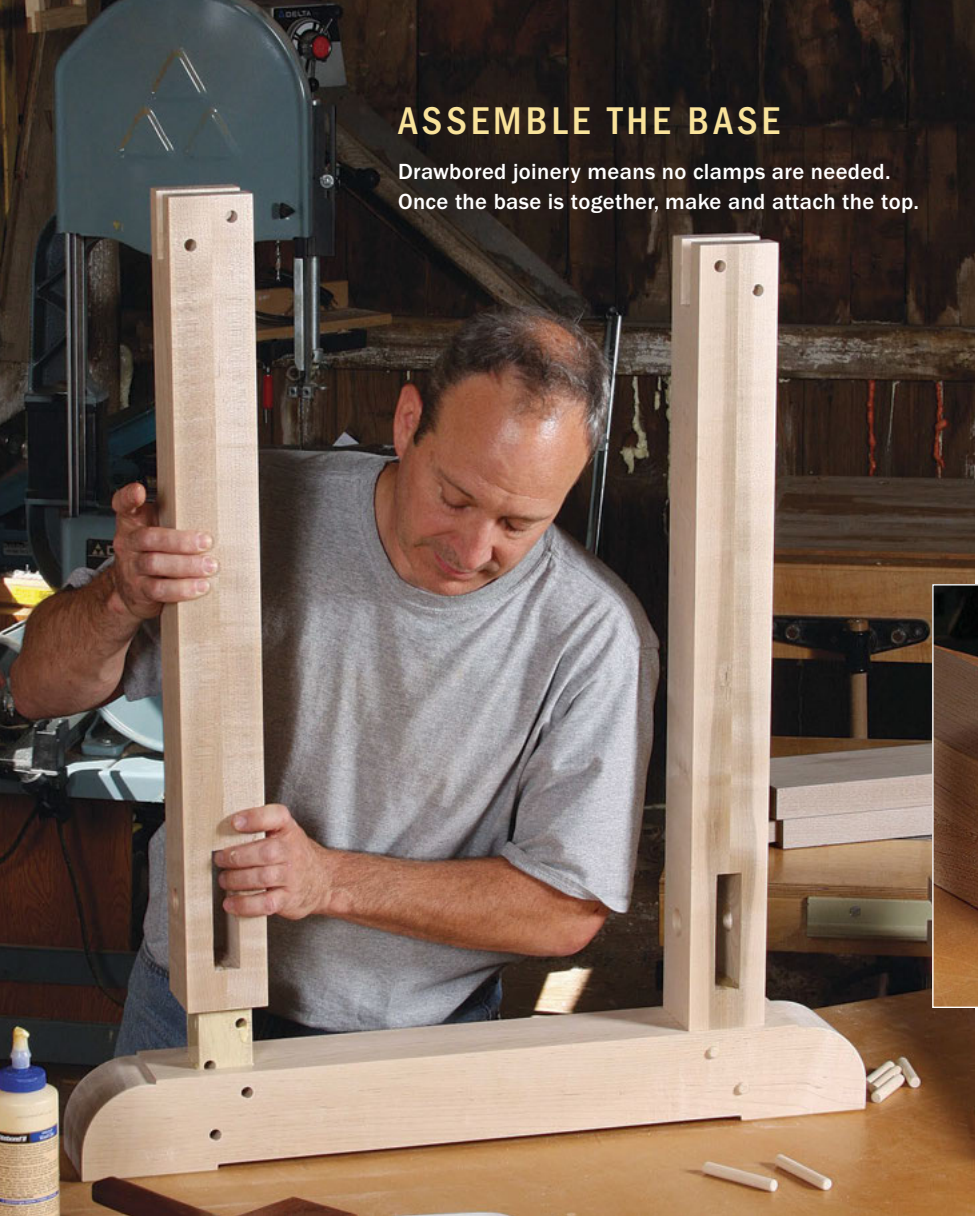
Transfer the hole. *Use the same bit you used to drill the peg holes. Just give it a tap.*

Offset the mark. *Use a punch to move it slightly (1/32 in.) closer to the shoulder.*

Now drill. *Any movement during drilling can prevent the drawbore from working properly, so clamp the post to the drill-press table.*

ASSEMBLE THE BASE

Drawbored joinery means no clamps are needed. Once the base is together, make and attach the top.



Posts and feet first. *After spreading glue on the joint, slide the post into the mortise. Because the peg hole in the tenon is offset toward the shoulder, the tenon is pulled into the mortise and against the shoulder when you knock in the pegs.*

deeper into the mortise and pulls the shoulder tight against the post. No need for clamps.

After the end assemblies are together, connect them with the two long stretchers. These don't get glue, so just put them together and knock in the drawbore pegs. Just like that, the base is done. Now on to the top.

Make the top and install the vise

The top is laminated from strips of maple. This means you'll need plenty of glue and a bunch of clamps. To avoid a lot of flattening after the glue-up, I use a proven technique that ensures a dead-flat top. Glue up several sections of the top

first. Each section needs to be narrow enough to fit across your jointer and through your planer after the glue has dried. Because I have a 12-in. jointer and planer, that means three sections. If your machines are smaller, you'll need to break the top into more sections.

After the sections have been rejointed (including edge jointing) and planed, glue them all together at once. Take care to ensure that they're aligned

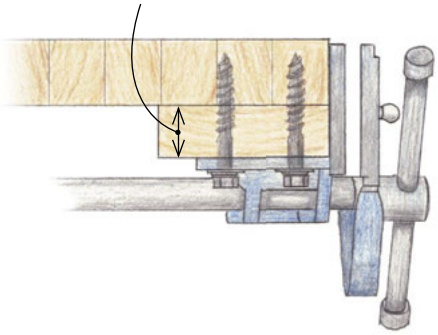
No glue for the long stretchers. *Slide the tenons in dry (above), then knock in the big drawbore pegs (right). This joint won't work loose, but you'll still be able to take it apart should you need to move the bench.*

ADD THE VISE

Cast-iron vises are strong and easy to install, but their metal jaws can mar and damage workpieces, so cover them with thick, shopmade wooden jaws.

SPACER BLOCK POSITIONS JAWS

Size the block so that the vise jaws sit just below the benchtop after installation. This way, you don't have to worry about accidentally hitting them with a plane or saw.



Bolt on the vise. *A spacer block lowers it so that the top edge of the back jaw sits just below the surface of the bench.*

Add the rear jaw. *Notch it to fit over the metal jaw. Screw through it and the holes in the metal jaw to anchor the screws in the benchtop.*

Block out the top. *This brings the front edge in line with the wooden rear jaw, which makes it easier to clamp wide and long boards in the vise.*

The front jaw is last. *After screwing it in place, plane the top edge of the wooden jaws flush to the benchtop.*

end to end and top to bottom. Doing this carefully should eliminate any need for flattening afterward.

To install the vise, you'll need to attach a spacer block between the bench and the vise to position the top edge of the vise's rear jaw flush with the top surface. This makes the vise much more useful for cutting joinery and planing boards on edge. Now mill up a piece of maple that's as thick as the rear jaw, as wide as the top is thick, and long enough to run from the vise to the opposite end of the bench. Glue it to the benchtop. This brings the benchtop in line with the vise's rear jaw and makes clamping boards in the vise much easier.

Put the top on the base. Attach it with six lag screws, three at each end. Put the table in place behind your tablesaw. Mark where the miter slots in the saw's table hit the benchtop, then widen it just a bit. Slide the table away from the saw, and rout slots in the benchtop to create clearance for miter bars. I do this with a flush-trimming bit and a template that has a notch slightly wider than the miter-gauge slot in the tablesaw.

Now the table is done. Apply some oil to the base and top, slide it place, and get to work. □

Kelly J. Dunton is restoring his 100-year-old barn as a place for chickens, ducks, and cars, but he's reserving the second story for his woodworking shop.

The Versatile Wedge

Use these simple shop helpers to tackle tricky glue-ups, hold parts at the bench, and more

BY BOB VAN DYKE

The wedge: I'm continually amazed at how something so simple can be so incredibly useful. It's common to see wedges used in joinery, and they are the traditional way that a cutter is held in a hand tool like a handplane or cutting gauge. But I also find them really handy in certain clamping situations where traditional clamps are cumbersome or completely ineffective.

Not only is the force created by wedging action great when used to hold parts together, but that same force can also be used to safely separate parts with no damage.

I constantly find new purposes for wedges in the shop, even though they've been around as long as recorded history. Here I'll show a few ways to clamp with wedges, a few ways to take things apart, and a few ways to hold work at the bench. Once you've explored all the ways wedges can help you in the shop, you may think twice about buying another expensive specialty clamp.

They are easy to make

If you save offcuts from angled furniture parts like tapered legs, you might already have ready-made wedges stashed around your shop. When I do need a wedge that's a certain size or with a specific slope, it's easy to cut one or two wedges from the edge of a board on the bandsaw.

When I need multiple wedges of the same size and shape, I cut them on the bandsaw with a simple jig (see photos, below). Plane the stock to thickness and cut it to length, then place it in the jig's notch and push it through the blade. Flip the stock end over end to cut the next wedge. For most clamping applications these bandsawn wedges will be ready to use right off the saw. But if the bandsaw leaves too rough a surface, clamp the wedges together in a vise and smooth them with a handplane.

To make wedges on a tablesaw, use a taper jig. Select a wide rectangular workpiece and set the fence to produce a tapered offcut just the size you want for your

How to make them

NEED JUST A COUPLE? GO FREEHAND

Lay out the wedges on a board and bandsaw to your pencil lines. These freehand wedges typically need smoothing with a handplane. Clamping them together in the vise for planing keeps the angles identical.

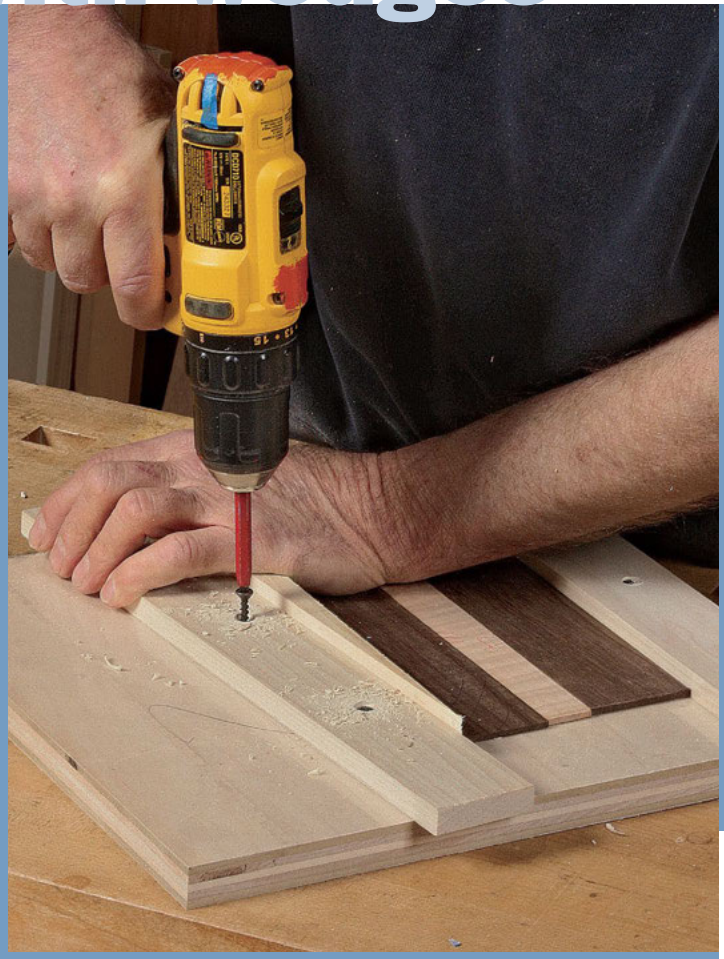
NEED A BUNCH? MAKE A JIG

Cut a notch the size and shape of the wedge you need in a piece of ¾-in.-thick MDF or plywood. Place the wedge stock in the notch and run the jig along the bandsaw's fence. Flip the workpiece end over end after each cut.

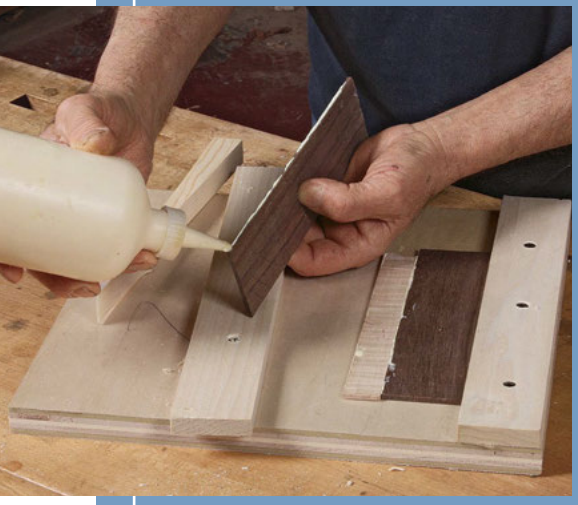
How to clamp with wedges

THIN PANELS

This jig clamps thin stock together by squeezing it between two fences with a wedge. It can be scaled up or down to match the size of any project.



Build the jig. *Screw one fence to a piece of ¾-in.-thick plywood (above). To keep from gluing your workpieces to the jig, add packing tape to the top of the base. Then set the workpiece and wedge in place, and screw on the other fence (right).*



Ready to work. *With the two fences in place, glue the edges of the workpieces and get them into position (above). A few light taps on the end of the wedge clamps this panel together (right). You can keep the pieces from springing up under the pressure by resting something heavy on top, like a handplane.*

Photos: Ben Blackmar

EDGING

With some help from a clamp across the end, you can use long, thin wedges to clamp edging onto the end of a countertop that's too long for your clamps to span.

Even pressure on edging. *A pine caul on each side helps line up the trim flush with the edges (above). Add a clamp across the end of the counter (right), spacing the bar about ¼ in. from the wood edging. Tap in wedges (below right) to apply pressure evenly along the glue joint.*

wedge. The type of wood used does not usually matter, but if there is a chance that the wedge could damage my work, I make it from a softwood like pine. Wedges are usually cut with the grain running down the length—wedges cut across the grain are likely to break when driven in.

Handle unique glue-ups

Wedges are perfect for joining small pieces and for other glue-ups that can be frustrating with conventional clamps. For instance, when edge-gluing wood to make thin door panels and small box tops, the pieces are difficult to keep flat in bar clamps, and sometimes the clamps just won't stay on.

To get around the problem, I use wedges and a simple fixture that's quick to make from scraps, screws, and packing tape. Cut two fences at least as thick and a little longer than the pieces to be glued, and wide enough that they won't flex under pressure—2 in. wide usually works. Make the base from a scrap of ¾-in.-thick plywood wide enough to hold the two fences, a wedge, and the parts to be glued. To keep glue from sticking to the base, I put packing tape on the top surface of the plywood.

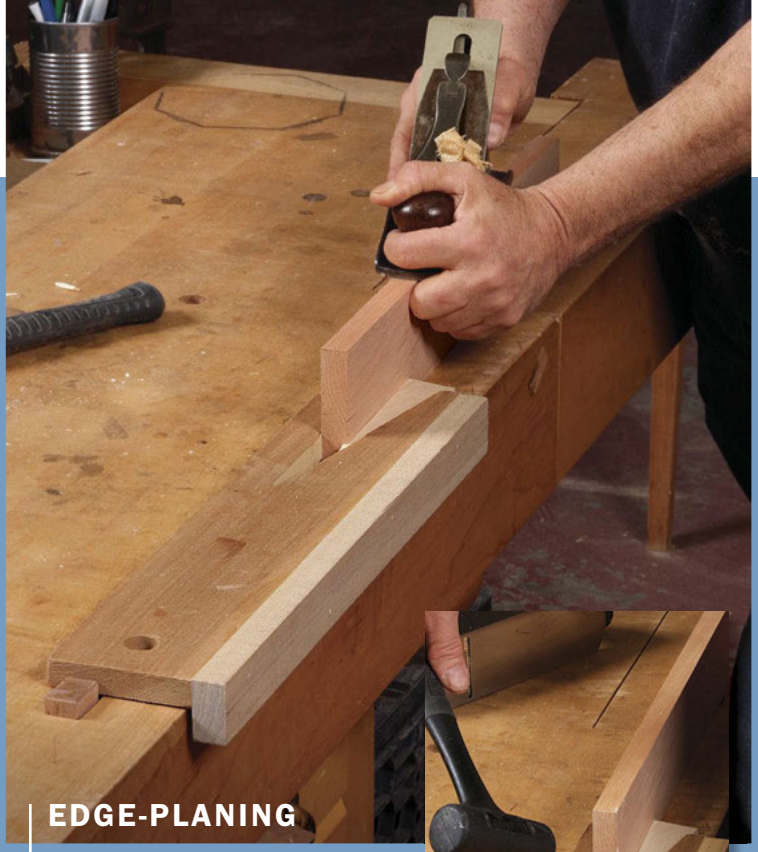
Screw one of the fences to the base and place the panels to be glued up side by side against it. Place a wedge longer than the workpiece next to it. Slide the opposing fence against the wedge and screw it

Hold work...

Wedges are great at helping secure stock at the bench. Save offcuts to use as benchtop shims and build a simple jig to make edge-planing and routing easy.

CUPPED PANELS

Wedges for wobbly wood. *Use wedges to stabilize a cupped board or an oddly shaped workpiece on the workbench.*



EDGE-PLANING

Wedged bird's mouth holds tight. *Slide the workpiece into the bird's mouth along with the hooked wedge. The force of planing will tighten the wedge's grip. Release the board by tapping on its end (right).*

in place. Remove the workpieces, glue the edges, put them back between the fences, and then tap in the wedge. The wedge will lock them in place and apply even pressure across the entire joint. To keep the pieces of the panel from springing up under pressure, stack a caul and a heavy object like a handplane on top.

Gluing edging to the end of a long countertop is another task made simple by wedges. I don't often have clamps long enough to reach the length of a countertop, so I place a bar clamp across the end and leave a small gap between the bar and the workpiece. Then I insert wedges between the clamp and the edging. Put glue on the edging and slip it in place, then add the clamp and tap in enough wedges from top and bottom to exert even pressure.

Hold work at the bench

I use an assortment of wedges at my bench to support or hold furniture parts. The wedges work great and don't get in the way like a clamp might. One way I use them is to stabilize parts that aren't flat, like a cupped board. I also place a wedge under a shaped part, like a tapered leg, so it won't rock as I plane it. For routing, I use a simple jig, clamping the work with opposing wedges.

ROUTING

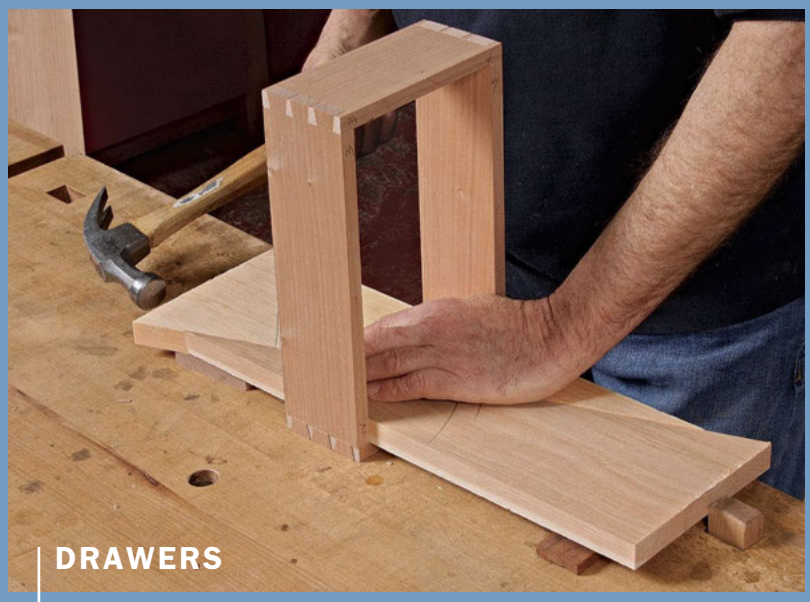
Wedges won't get in the way. *Opposing wedges can clamp work for routing. Van Dyke uses a U-shaped jig to hold the workpiece for mortising and to support the router. A pair of wedges anchors the work solidly in the jig.*

...or take it apart

How many times have you been frustrated when trying to get templates off workpieces or disassembling a dry-fitted drawer? Wedges are the solution. They even help take apart furniture without damage.

TEMPLATES

Take off a stuck-on template. *A router template attached with double-sided tape isn't always easy to get apart. Drive in wedges to separate the pieces.*



DRAWERS

Safely separate stubborn dovetails. *Two large opposing wedges force the sides apart while keeping them parallel, so there's no chance of cracking a pin.*

Clamping stock in a bench vise for edge-planing is another task that can be awkward, especially with long boards in situations where the ends are unsupported. A bird's-mouth jig with a wedge makes this job easy because the entire length of the board is supported on the benchtop. To use it just push the end of the board into the bird's mouth with the hooked wedge, and the piece will be held tight. To release it, just give it a tap on the end.

Disassemble without damaging

Long, low-angle wedges are perfect for separating parts that have been temporarily joined with double-sided tape, like a flush-cutting router template. To separate tight dovetails in a dry-assembled box while keeping the two sides parallel, you can drive wide opposing wedges between the two sides. You can use thin, low-angle wedges to disassemble furniture for repairs, too. Carefully drive them in to separate stubborn old glued-up parts for repair without further damaging the piece.

Try a few of these techniques, and it might just spark your imagination to come up with other ways to put wedges to work. □

Bob Van Dyke is the founder and director of the Connecticut Valley School of Woodworking.

FURNITURE REPAIR

Put down the pry bar. *When the glue in those tired old furniture joints gives out, wedges do a great job getting them apart for repair without marring the wood.*

Pedestal Dining Table

I have long admired Alan Peters's graceful pedestal dining table, and the work of Sidney and Edward Barnsley that inspired it. So when I was asked to make a dining table for an exhibition sponsored by *Maine Home and Design* magazine, I jumped at the chance to follow in the footsteps of some of my woodworking heroes.

What is great about pedestal tables is the absence of legs. Without the usual four posts getting in the way, a chair can be slid into any position under the tabletop. However, like most things in life, there are trade-offs. The trouble with the single pedestal design is that all the forces are focused through the central column. Those forces include not only downward leverage when someone leans on the edge, but also twisting forces, especially with a large tabletop like this one. So you need a thick, rigid central column connected to the top with rock-solid joinery.

This pedestal design has a good balance between stiffness and elegance. It has been tested in the hostile environment of my own home. My three boys can smell weakness, and this table has been a worthy adversary for a few years now. At nearly 40 in. by 62 in., there is ample space for six people, eight in a pinch.

Although the anatomy looks complex, all of the joints are easily executed with basic woodworking tools, making this a manageable project.

The base has three components: the feet, the column, and the arms under the top. The arms and column segments are the same thickness while the feet are thicker. Because this table is rectangular in shape, not square, the base has a long and short axis to echo that fact. I gently curved the sides of the top, primarily because I like the way it feels to sit around that shape.

VIDEO WORKSHOP

Watch Rousseau build this table from start to finish in a members-only Video Workshop series.

Base starts with arms and feet

When milling the base components, make some test parts for setting up machines. They can be made from a different wood, but they must have the same dimensions as the table stock.

The general rule in furniture making is mortises first, tenons second. That's why you'll start with the feet and arms, and do the column last. You'll also want to cut the mortises and half-laps in the arms and feet before shaping them, while the pieces still have square edges for reference.

The joinery on the feet and arms looks complex, but when you do the mortises first, the half-laps then cut across them and magically generate that sophisticated-looking joint.

Start by marking centerlines on the arms and feet in both directions, length and width. Then, after cutting the mortises, you'll be able to align the pieces accurately, one atop the other, and use a

Photos: Asa Christiana

Smart anatomy builds strength into a user-friendly design

BY TIMOTHY ROUSSEAU

sharp 2H pencil to trace the edges of each piece onto the other, carrying the lines down the sides to lay out the half-laps.

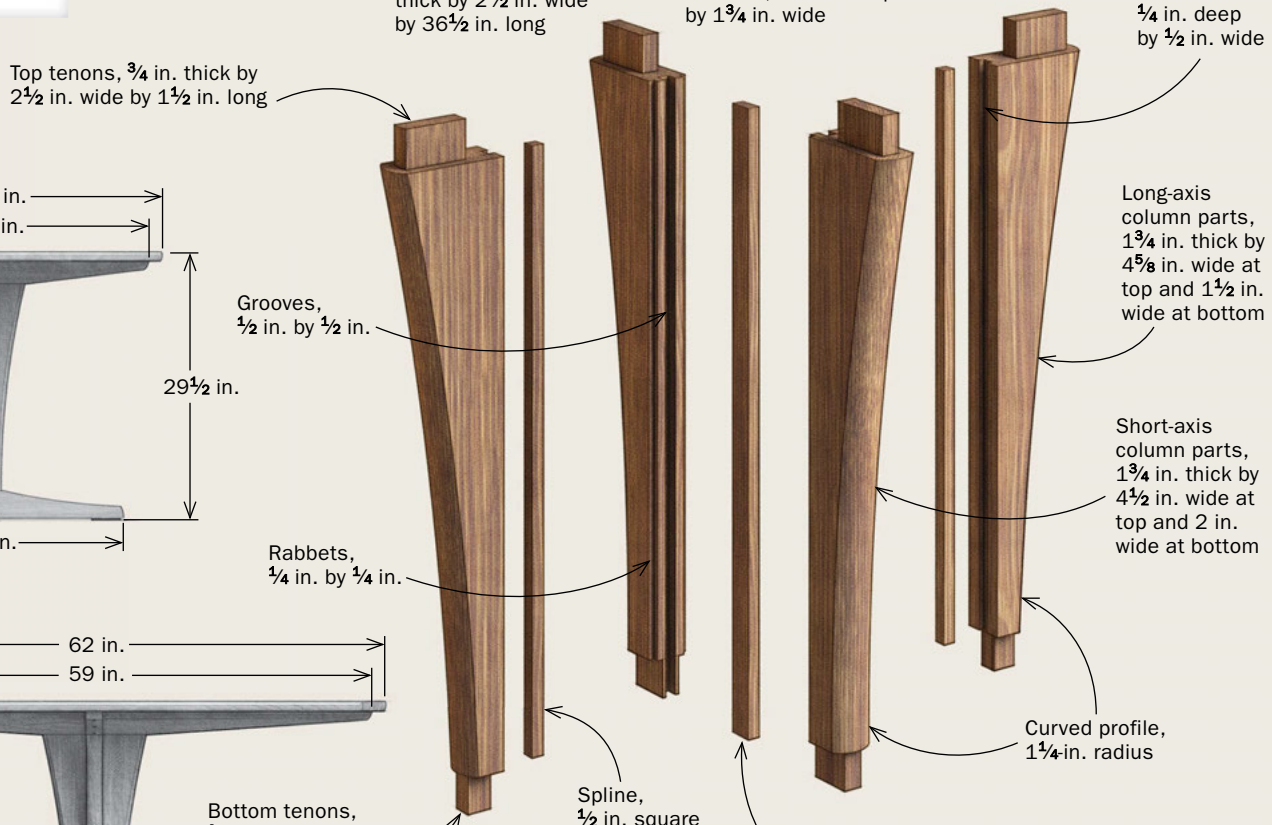
Pay very close attention to which face of a part gets the notch. If it's on the wrong side, the base will not go together. With the waste areas clearly marked, use a dado set in the tablesaw to notch out the material between the layout lines, nibbling the edges until the notch just starts to slip onto the mating part. Then take light passes with a handplane, a shaving at a time until the pieces come together half to three-quarters of the way. At that point, they should go the rest of the way under clamp pressure.

Tapers and curves complete the arms and feet

With the half-laps complete, you can shape the feet and arms. The arms, which can't be seen without stooping down, get a simple bandsawn taper that I smooth with a handplane. I smooth the small curves on the ends with a rasp, files, and a sanding block.

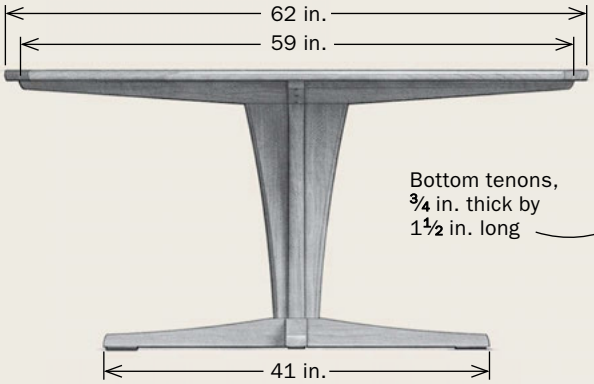
Elegant and strong

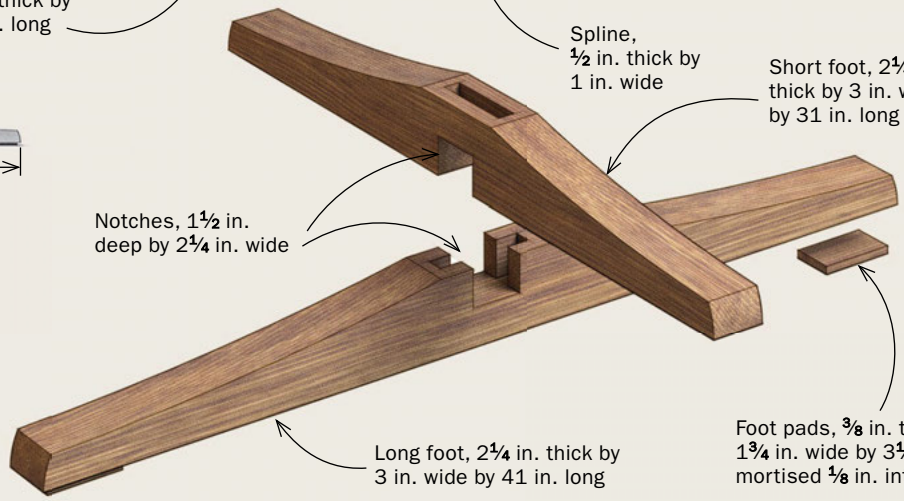
The joinery in this pedestal is designed to create serious strength in a graceful column. While it seems complex, the joinery can be broken into a series of simple steps.



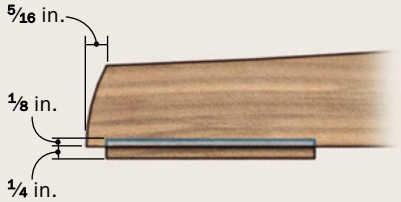
END VIEW

SIDE VIEW

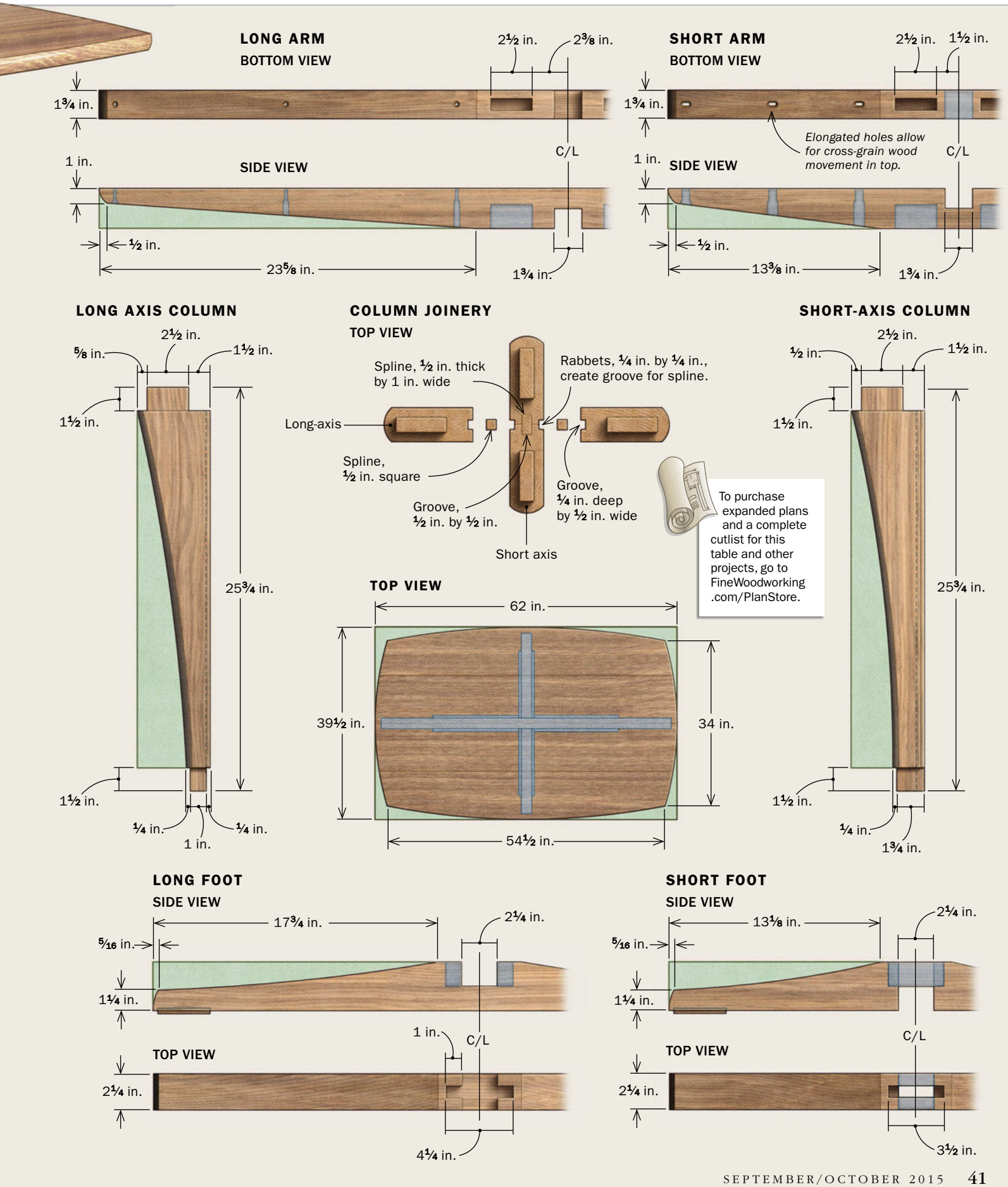




FOOT DETAIL



Drawings: John Hartman

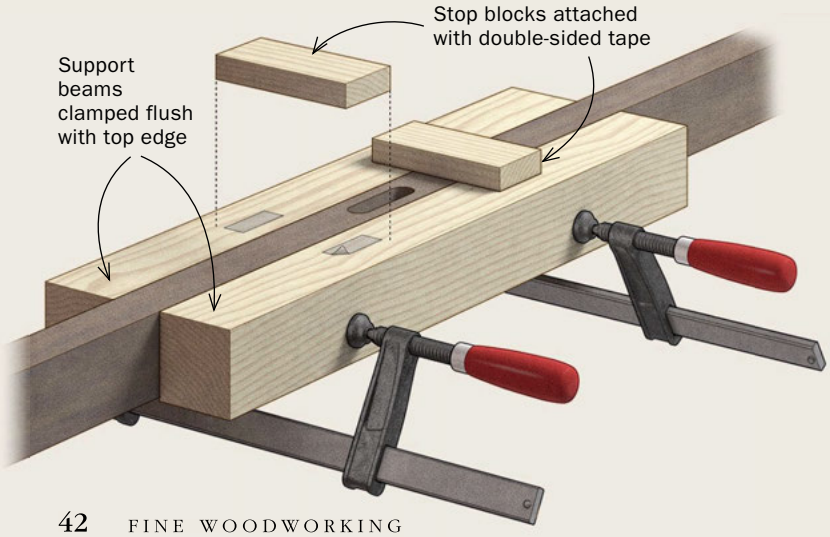

LONG ARM
BOTTOM VIEW
2½ in.
2⅜ in.
1¾ in.
C/L
SIDE VIEW
1 in.
½ in.
23⅝ in.
1¾ in.
SHORT ARM
BOTTOM VIEW
2½ in.
1½ in.
1¾ in.
Elongated holes allow for cross-grain wood movement in top.
C/L
SIDE VIEW
1 in.
½ in.
13⅜ in.
1¾ in.
LONG AXIS COLUMN
⅝ in.
2½ in.
1½ in.
1½ in.
25¾ in.
1½ in.
¼ in.
¼ in.
1 in.
COLUMN JOINERY
TOP VIEW
Spline, ½ in. thick by 1 in. wide
Rabbets, ¼ in. by ¼ in., create groove for spline.
Long-axis
Spline, ½ in. square
Groove, ¼ in. deep by ½ in. wide
Groove, ½ in. by ½ in.
Short axis
To purchase expanded plans and a complete cutlist for this table and other projects, go to FineWoodworking.com/PlanStore.
TOP VIEW
62 in.
39½ in.
34 in.
54½ in.
SHORT-AXIS COLUMN
½ in.
2½ in.
1½ in.
1½ in.
25¾ in.
1½ in.
¼ in.
1¾ in.
LONG FOOT
SIDE VIEW
17¾ in.
2¼ in.
5/16 in.
1¼ in.
1 in.
C/L
TOP VIEW
2¼ in.
4¼ in.
SHORT FOOT
SIDE VIEW
13⅛ in.
2¼ in.
5/16 in.
1¼ in.
C/L
TOP VIEW
2¼ in.
3½ in.

Arms and feet first

CENTER THE MORTISES

Rousseau makes these ¾-in.-wide mortises in two passes with a ½-in.-dia. spiral upcut bit, reversing the router setup between passes to center the mortise.

Solid setup. *Rousseau places the workpiece upside down on the bench and clamps two beams alongside it, flush with the top edge. These provide extra support for a router, which is equipped with two edge guides that hug the beams. Both guides are factory-made, but Rousseau bought longer steel rods to accommodate the beams.*



Square the ends with a chisel. *To guide the chisel, knife a line at each end of each mortise.*

The feet get long, graceful curves. To make them uniform, I use tracing templates made from ⅛-in. plywood. I cut the parts using a bandsaw and smooth them with a spokeshave. I follow the spokeshave with a card scraper on the long curves. I smooth the short curve on the ends with a rasp and files. Then I sand everything by hand using a rubber sanding block.

Do the column joinery before routing the curves

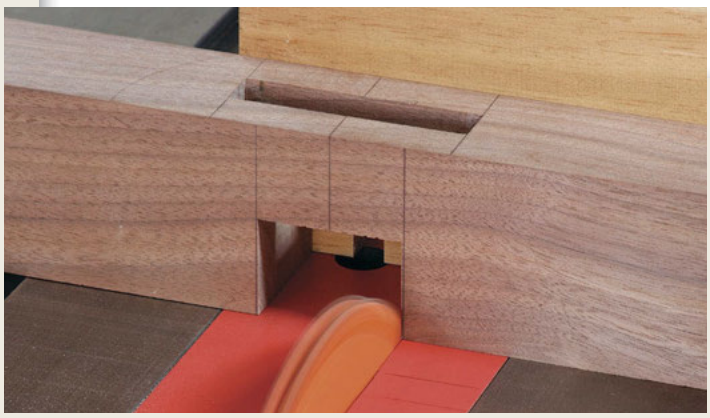
The column has splines that connect the parts, and tenons that connect the assembly to the arms and feet. The first step for this joinery is to cut tenons on the ends of the four individual workpieces while they are still separate components and before any curves are cut. Start by cutting the cheeks on the ends of all of the column parts.

To mark and cut the various end shoulders, I find it more accurate to work directly from the mortises in the feet and arms. But there is a specific order you must follow. Start with the shoulders on top of the short-axis pieces, lining up each piece with the centerline of the shorter arm. Make the shoulder cuts at the tablesaw, and complete the ends of the tenon with ripcuts on the bandsaw. Now do the same thing to the tenons on the bottom of the short-axis pieces (these tenons are shouldered on the outside only).

Only when these tenons are cut and fitted into the shorter arm and foot can you dry-fit the longer arms and foot and mark the tenons on the last two column pieces.

CUT AND FIT THE LAP JOINTS

After handplaning their sides to get the mating arms and legs close to final width, Rousseau uses centerlines to align them in both directions, tracing pencil lines along the edges and then carrying those onto the sides of the pieces.



Nibble to the line. *Using a dado set and an accurate crosscut fence on the tablesaw, sneak up to the pencil line without quite touching it.*

Handplane to fit. *There should be just a bit of handplaning left to get the pieces to enter their notches fully. The goal here is to get them to go about three-quarters of the way. Clamps will do the rest later, and you don't want to scar the pieces now by driving them all the way home.*

After all of the tenons are trimmed to size, the last step is to make grooves for the splines that run between the column parts. Then mill up some hardwood spline stock to fit the grooves, leaving them a little narrow so there is a gap at the bottom of the grooves for excess glue to squeeze into.

With the joinery done on the column parts, you can shape the curves. There is a partial bullnose profile on their outside edges, which is a good reason to choose template routing over hand shaping. I usually rout this curve on the shaper with a tall cutter, but I'll show you how to do it with a router bit. The tallest bit I could find with the right profile cuts only a 1½-in.-tall bullnose—leaving a flat shoulder on the top and bottom of these 1¾-in.-thick pieces—but a spokeshave and a curved sanding block finish the curve nicely.

SHAPE THE ARMS AND FEET LAST

With the joinery done, you can shape the parts. The arms get a simple taper while the feet get a curve. Be aware that these shapes are different for the long- and short-axis parts.

The bit is from Whiteside, and I added a Whiteside bearing and lock collar to turn it into a template bit. It's worth doing since you'll use the same bit setup later to trim and mold the edges of the tabletop.

Use the dimensions on pp. 40-41 to make two more templates from ½-in.-thick MDF or plywood. Make the curves extralong so you have a safe place to start and stop the bearing, and make the templates extrawide to make

Bandsaw to the line. *After laying out the tapers, long curves and rounded tips, bandsaw close to the line. Rousseau smooths the parts with hand tools.*

Drill for attaching the tabletop. *The screw holes and counterbores in the shorter arm need to be slotted to allow for wood movement in the top. Do that by overlapping holes and clearing the waste between them with a chisel.*

Make and shape the column parts

TENONS FIRST

Start by cutting the cheeks on each part, and then partially dry-fit the parts of the base to see where to cut the end shoulders.

Start with the cheeks. *Make shoulder cuts first (above), before finishing the tenons on a tenoning jig (below). This sequence allows the waste piece to fall away safely.*

room for the locator blocks that also hold the toggle clamps.

I locate the workpieces on the jigs so the edge of the template represents the outermost part of the profile. That means you can put the part in the jig and use it to trace a line for bandsawing the waste away. Then when you put the pieces back in the jig for routing, you can just put ⅛-in.-thick spacers behind the workpiece to push it outward for multiple passes and a smooth result (see photos, opposite).

Base glue-up needs a game plan

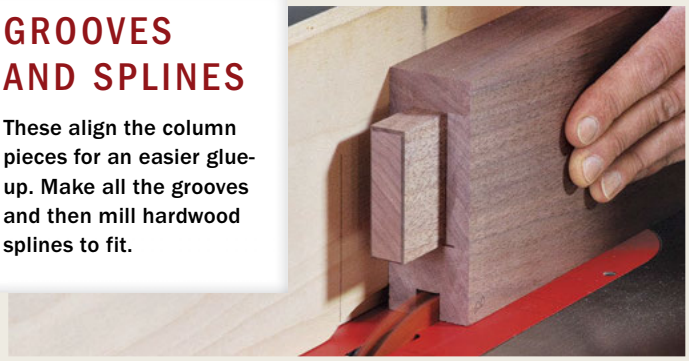
The base joinery is a puzzle of sorts, and must be assembled in a certain order. All of the parts along the short axis—feet, column, and arms—are assembled first. Once that glue-up has cured, the long axis parts are added.

The first glue-up is the short axis column parts, which are connected by a spline. I can get good pressure at the top and bottom by clamping across the tenons, but curved cauls are needed to help apply pressure squarely across the central, curved areas. The trouble is that the angle of the curve is ever-changing as it moves along. To match it at a few key points, I use a hole saw to make big angled holes in pine blocks, cutting the blocks in half to make matching clamping cauls.

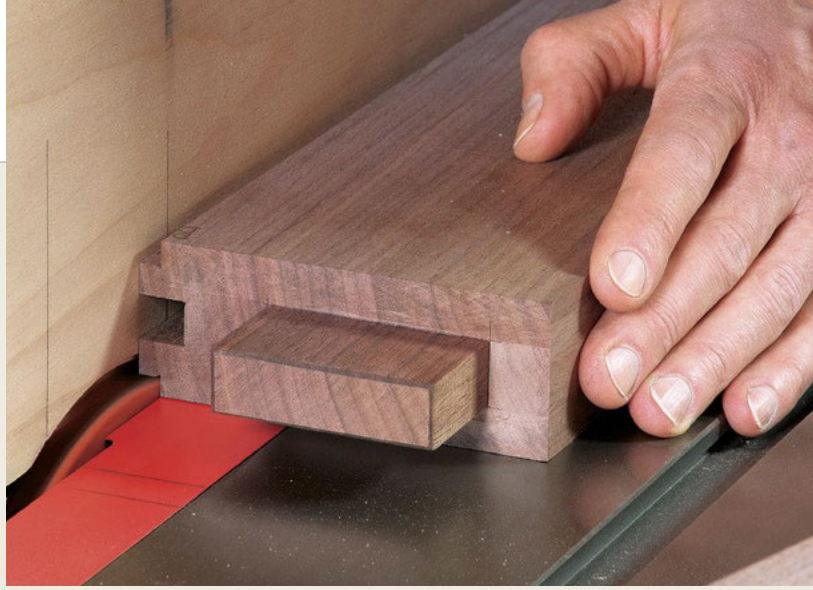
Trim on the bandsaw. *Hold the column parts against the arms and feet to mark where to trim each tenon. Make the shoulder cuts at the tablesaw and then use the bandsaw to trim away the waste.*

GROOVES AND SPLINES

These align the column pieces for an easier glue-up. Make all the grooves and then mill hardwood splines to fit.



Center the grooves. *Use a test piece and dial calipers to center the grooves before working on the real workpieces.*



Rabbets form grooves, too. *The edges of the short-axis pieces get rabbets, which form grooves when these pieces are joined. Bury the dado set in a sacrificial fence to cut these.*

SHAPE CURVES IN TWO STEPS

The long- and short-axis pieces get slightly different curves, so you need two templates, which serve as router-table sleds. They are extralong to give a lead-in and take-off surface for the router bearing. Locator blocks also serve as attachment points for toggle clamps.

Rout in stages. *This is a deep cut, so after roughing away the waste, Rousseau inserts ⅛-in. spacers for a first pass on the router table, and then another set to create the full ¼-in.-wide profile.*

MULTIPURPOSE ROUTER BIT

Rousseau uses this router-bit setup to shape the profile on both the column parts and the tabletop edges. It comes up a little short on the thick column parts, leaving a bit of handwork to do on the edges.

Whiteside Oval-Edge Bit
No. 1480
$53

Whiteside Bearing
No. B16
$13.82

Whiteside Lock Collar
LC ½ in.
$2.81

During this first assembly it is critical that the shoulders of the two parts line up and stay that way as the glue dries. I align these shoulders by putting a long bar clamp on the ends of the tenons.

Stop for surface prep—After gluing the two narrow column parts together to form one big flat part, plane and sand all of the column components. I handplane the flat surfaces and sand the curves, being careful not to round over the crisp edges. Then you are ready to glue on the shorter arm and foot. You might be tempted to put glue on sparingly, to prevent a lot of squeeze-out. Instead, butter up both the mortises and tenons generously, as well as the half-laps. You need full strength in these joints, and

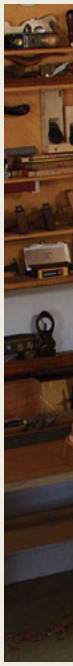
Standard spokeshave finishes the job. *Watch the facet you are making to gauge your progress. Sand with a block afterward.*

Assembly's like a puzzle

Put the sections together in stages. Clean up the squeeze-out and let the glue dry before moving from one stage to the next.

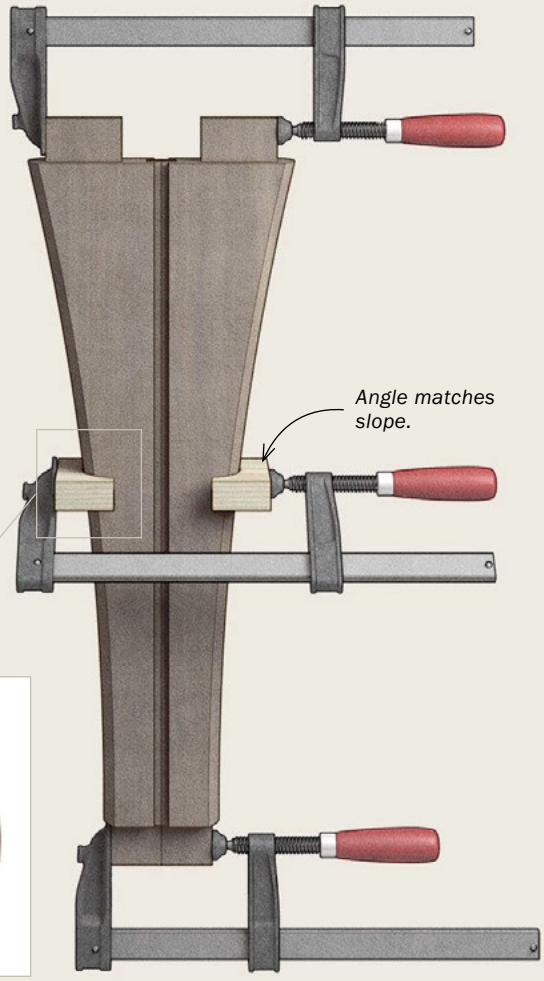
Two column pieces first. *Start by gluing the two short-axis column pieces together, using a spline to align them. Use a long bar clamp to ensure that the ends of the tenons and their shoulders end up dead even.*

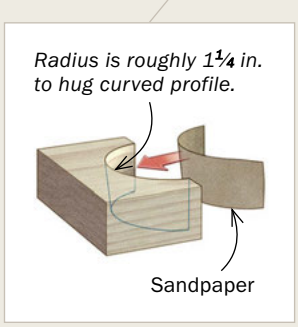
Add the short arm and leg. *Apply plenty of glue to these joints. It's better to deal with squeeze-out than to have a glue-starved joint.*



CURVED CAULS TO THE RESCUE

To get pressure directly across the middle of the joint, you'll need clamping cauls that match both the curve of these pieces and the slope at the point where they are placed. Rousseau makes them by using a hole saw to drill through a pine block at an angle, cutting the block in half, and then attaching sandpaper to the inside face with yellow glue to keep the cauls from slipping.





the cleanup is worth it. With all of the short-axis parts assembled, and the squeeze-out removed, you can add the rest of the pieces to the puzzle. Dry-fit everything to check it as you go. You may have to trim the tenons a bit more or handplane the back edge of the last two column pieces for a clean joint with the others. Again, you'll need curved, angled cauls to get pressure along the entire glueline.

The last bit of work on the feet is adding thin hardwood pads underneath. The table will be steadier on just four points, and easier to move around. You could just glue on thin pads, but I think those are likely to be knocked off over time. So I glue the pads into shallow pockets.

Finish off the top

The base is now ready for its first coat of Watco Danish Oil. I used the natural color for this walnut. While that first coat dries, turn your attention back to the tabletop.

The square top has pillowed edges, with long curves and a partial-bullnose profile, echoing the edges of the column. I rout these edges using the same curved bit as before. After roughing out the shape with a jigsaw, I guide the router bit with two long templates, one for the short edge and one for the long one. To complete the table, sand the base and top up to 320 grit, and then apply four to five more coats of Watco. Before one last thin coat, I buff the surface with a Festool 500 pad on my random-orbit sander. It works beautifully. □

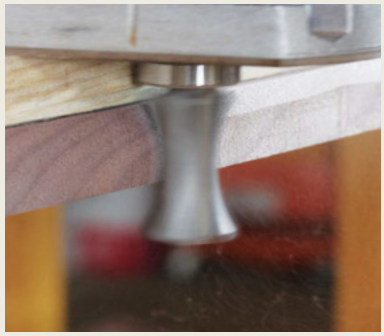
Timothy Rousseau is a furniture maker in Appleton, Maine, and a regular instructor at the nearby Center for Furniture Craftsmanship.

Last two column parts. *Add the two final splines, and glue on the last two column parts, using curved cauls again. Dry-fit the last foot and arm to be sure to be sure all of the tenons line up with their mortises.*

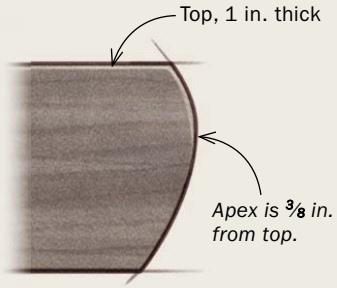
The last arm and foot. *To pull the half-laps all the way home, you'll probably need to use bar clamps and a mallet. Rousseau uses epoxy here to buy some extra time.*

PROFILE THE TOP

Rousseau uses long templates to rout the side and end curves, and the same bullnose router bit to form the curved profile on the edge at the same time. He does the end-grain first, and then the long edges to remove any chipout at the ends.



Take it in two passes. *After cutting away most of the waste with a jigsaw, make a first pass to remove some of the remaining waste (above), and then reposition the template for a last pass and a smooth final surface (left).*



PROFILE IS OFF CENTER

Set the bit height slightly high of center for a more interesting profile.

TOOL TEST

Drill Presses

Floor-standing models have more power, capacity, and convenience than benchtop models

BY WILLIAM PECK

NARROWING THE FIELD

Most drill presses are designed for machinists, so we insisted on these two woodworker-friendly features.

Extra quill travel. *We looked for at least 4 in. of travel, for mortising this big trestle foot, for example.*

Table tilt. *Machines with at least 45° of table tilt allow angled holes like those in this Windsor chair seat.*

Photos, except where noted: Asa Christiana

While a benchtop drill press will be adequate for the majority of holes you drill, there will be times you'll want the power and capacity of a full-size machine. On average, floor-mounted drill presses offer more power, larger tables, and more swing (the distance between the post and the chuck). Most importantly, many of today's machines have 4-in.-plus of quill travel (the distance they can plunge a drill bit), which not only makes deeper holes possible but also means you won't have to adjust the table height as often—still an awkward process on any drill press. Finally, a floor-mounted drill press might actually save space in your shop, by sitting in a corner vs. taking up valuable countertop space.

Drill presses haven't evolved far from their machine-shop roots, so I focused on models with two woodworker-friendly features: quill travel of at least 4 in. and a table that tilts 45° in both directions. That narrowed an enormous field to 10 machines from six manufacturers. (Jet, Powermatic, and Shop Fox had machines that fit our criteria, but they declined to participate.) Chucks ranged from ⅝ in. to ¾ in., all plenty big for woodworking bits. All came prewired for 120 volts.

Clean, consistent holes of any size

The main reasons I choose a drill press over a handheld drill are power and precision, so I looked at those attributes first. To test power, I used a 2-in.-dia. high-speed steel (HSS) Forstner bit to drill through 2 in. of hard maple. I used Lee Valley and Veritas bits for all the tests, as they have done very well in *FWW*'s past tool tests.

I ran the bit as close to the recommended 400 rpm as each model allowed, and I drilled with a very heavy hand. I wasn't able to stall any of the motors, but I was able to make the belts slip on a few—the Rikon 30-236, the Porter-Cable, and the General International 75-700—even after pulling the belts extra tight. That meant I couldn't push this big bit quite as hard on these machines. However, that would only be a problem if you were drilling scores of big holes a day. All of the machines produced very clean holes, by the way.

To test runout and accuracy, I tightened ¼-in.-dia. and ½-in.-dia. drill rod (precisely ground lengths of drill steel) in the chuck, placed a dial indicator against the rod, and turned the chuck slowly by hand, letting

Two stand-out machines

AUTHOR'S BEST OVERALL CHOICE

DELTA 18-900L

The Delta 18-900L was a no-brainer for the Best Overall award. It has the most quill travel, a big table that tilts in both directions, the fastest and easiest speed changes, a quick-adjust depth stop and quill lock, an effective head-mounted laser pointer, and plenty of power and accuracy.

A Delta bonus. *The Delta is the only machine with a usable table insert. It is leveled via set screws, and you can screw into it from below to hold it down.*

AUTHOR'S BEST VALUE CHOICE

PORTER-CABLE PCB660DP

At one-third the price of the Delta, the Porter-Cable PCB660DP is the most affordable machine in the test and an easy pick for Best Value. It offers a quick-adjust depth stop and quill lock, a good laser pointer, and easy speed changes. The table is small, with a rim that is ¼ in. below the center section (making it hard to clamp at the edges), so you will definitely want to add an auxiliary table. But at $320, this machine is a steal.

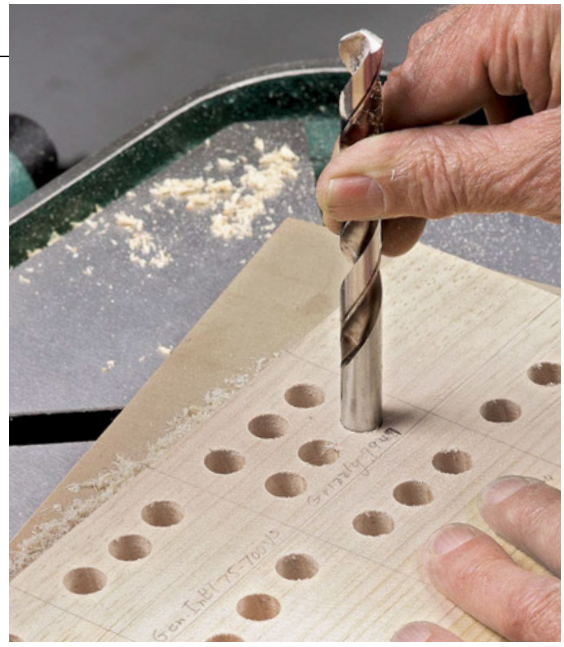
Photos, this page: John Tetreault

Hard data

POWER

Timed test. *Peck drilled through 2 in. of maple with a 2-in.-dia. Forstner bit. All the machines handled this tough test well, but elapsed time varied.*

RUNOUT



Measured and real world. *To test drilling accuracy, Peck used a drill rod and a dial indicator (above), turning the chuck by hand. Then he drilled a series of holes, and inserted the drill shank (right) to check for oversize ones.*

TABLE SQUARENESS

Front-to-back squareness. *With a piece of flat MDF on the table to even out inconsistencies, Peck placed a square against the drill rod. A few tables had a bit of sag, but the one from Central Machinery (shown) had a lot.*

go before taking each reading. In case the chuck's grip was inconsistent, I remounted the rods several times and repeated the test, averaging the results. Runout ranged between 0.001 in. and 0.005 in. We rated anything under 0.003 in. as "good" or better.

To see how this slow-moving test would be reflected in actual performance, I drilled ¼-in.-dia. and ½-in.-dia. holes in soft pine, plunging the bits slowly to allow any runout to affect the hole diameter. I then removed the drill bit from the chuck and inserted the shank end into the hole, looking for looseness. All of the machines did much better on this real-world test. The ¼-in. shank fit snugly in all of its holes, while the ½-in. holes had only minor looseness—around 0.001 in. for all machines except the Porter-Cable, where I found an extra 0.001 in. of wiggle, which is still very acceptable. And all produced clean results, even at the rim of the hole.

I combined the dial-indicator test and the drilling test into one runout rating, shown in the chart on pp. 52-53.

One table stood out

The variously sized cast-iron tables were not a concern, as most people will place some sort of plywood or MDF auxiliary table on top of theirs to prevent tearout on the bottom of holes. All of the tables have mounting slots for this purpose.

However, with its large overall size, flat edges for clamping, and unique table insert, the Delta's table works fine on its own. The replaceable insert sits on set

TIP

Simple fix. *On the tables with a tiny bit of sag, a few strips of paper under an auxiliary table was enough to correct the problem.*

Friendly features

SPEED CHANGES

Variable is fastest, but ... *On the two variable-speed machines, speed changes happen in seconds. But the General International 75-700 (shown) still requires a belt change between a high and low range, and the Rikon 30-236 doesn't go low enough for the biggest cutters.*

Best of the belts. *With a quick-release tension roller, the Delta's belts were the fastest to change by far.*

DEPTH STOPS

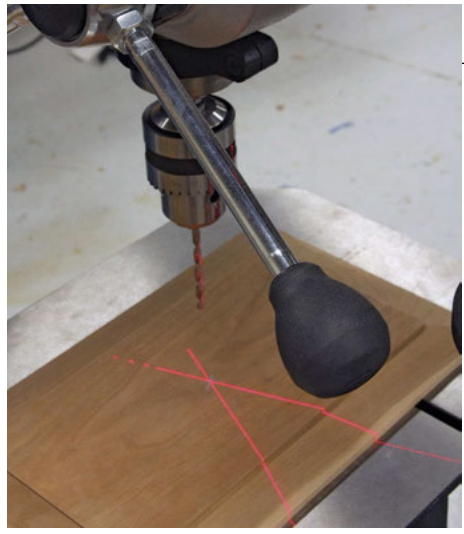
Quick-adjust. *The Porter-Cable, Delta, and Rikon 30-240 machines have a quick-release button on their depth stops as shown here. Others make you spin a nut (or a dial) for big adjustments.*

Spindle lock. *Most machines have a way to lock the quill at various heights, which is a must when using a sanding drum. The Delta and Porter-Cable do it with another quick-release button, which is handy.*

TABLE TILT

Delta is unique. *It is the only machine that allows front-to-back adjustment as well as the usual side-to-side, making compound angles possible as well as correcting table squareness.*

LASERS



Not always an asset. *Peck preferred the head-mounted lasers that are hard-wired into the machines, like those on the Delta and Porter-Cable (shown). These are less likely to shift out of alignment than column-mounted models.*

Central Machinery 39955

Delta 18-900L

General International 75-260 M1

General International 75-500

General International 75-700 M1 VS

MODEL	PRICE/ WARRANTY*	MOTOR	SPEEDS/RANGE	SWING	QUILL STROKE	TABLE SQUARENESS (FRONT TO REAR)
Central Machinery 39955	$560/ 90 days	1½ hp	12/ 180–3,865 rpm	20 in.	4¾ in.	Fair
Delta 18-900L	$1,030/ 5 years	¾ hp	16/ 170–3,000 rpm	18 in.	6 in.	Adjustable
General International 75-260 M1	$760/ Lifetime	1 hp	12/ 255–2,750 rpm	17 in.	6 in.	Excellent
General International 75-500	$1,200/ Lifetime	1 hp	12/ 120–2,270 rpm	17 in.	4½ in.	Excellent
General International 75-700 M1 VS	$2,100/ Lifetime	1 hp	VS/280–1,140 and 800–3,200 rpm	22 in.	5⅞ in.	Excellent
Grizzly G7947	$575/ 1 year	1 hp	12/ 210–3,300 rpm	17 in.	4¾ in.	Very good
Grizzly G7948	$695/ 1 year	1½ hp	12/ 210–3,300 rpm	20 in.	4¾ in.	Excellent
Porter-Cable PCB660DP	$320/ 3 years	¾ hp	12/ 300–3,100 rpm	15 in.	4 in.	Very good
Rikon 30-236 VS	$750/ 5 years	1½ hp	VS/ 550–2,300 rpm	17 in.	6 in.	Excellent
Rikon 30-240	$1,050/ 5 years	1 hp	12/ 180–3,865 rpm	20 in.	4¾ in.	Excellent

* Check with manufacturers for limitations.

screws, which not only keep it level but also allow dust to get onto the ledge below without lifting the insert.

Speed changes separate the pack

While smallish bits can all be run at a similar speed, anywhere between 1,000 and 2,000 rpm, bits bigger than ½ in. dia. should be run in the 500 to 1,000 rpm range, and some very large Forstner bits and wing-cutters should be run even more slowly. So you will be changing speeds pretty often.

The time needed to make speed changes varied considerably among machines. In theory the two variable-speed units would shine here, but the General International 75-700 still requires a belt change to get from a lower speed range to an upper one, and that belt change is tedious, thanks to set screws that require an Allen wrench, and a long motor-cover screw that must be completely unthreaded. And while the Rikon 30-236 has a single speed range, adjustable on the fly, it only goes down to 550 rpm. To see if this really was a problem, I used a circle-cutter to cut a 3-in.-dia. hole with the Rikon. I stopped when the cutter began to overheat and discolor. At 300 rpm, however, another

Photos: this page and opposite: John Tetreault

Grizzly G7947

Grizzly G7948

Porter-Cable PCB660DP

Rikon 30-236 VS

Rikon 30-240

RUNOUT	AVERAGE SPEED CHANGE	POWER TEST**	QUILL LOCK	WORK LIGHT	COMMENTS
Good	1 min.	10 sec.	Yes	Poor	Weak work light, too much table sag front to back.
Excellent	30 sec.	11.5 sec.	Yes	Good	Best table, easiest belt changes, quick-release depth stop, only machine with front-to-back table adjustment.
Good	2 min., 50 sec.	11 sec.	No	None	Good accuracy but tedious process for changing speeds.
Good	2 min.	11 sec.	No	Very good	Good accuracy, very good work light, useful low-end speed, but difficult belt changes.
Good	Variable, 2 min. range change	12 sec.	No	None	Accurate, but two variable-speed ranges require troublesome belt change.
Fair	1 min., 5 sec.	8 sec.	No	Very good	Tied for most power, very good work light.
Very good	1 min., 10 sec.	8 sec.	No	Very good	Tied for most power, very good work light.
Good	53 sec.	19 sec.	Yes	Very good	Good accuracy, great conveniences, low price.
Excellent	Variable	19 sec.	Yes	Good	Most accurate drill press, and variable speed is easiest to change, but low-end speed is only 550 rpm.
Very good	1 min.	13 sec.	Yes	Very good	Very accurate, with quick-adjust depth stop and very good work light.

** Average time needed to drill 2-in.-dia. hole through 2 in. of hard maple.

machine had no problem with the same task.

The other eight machines require a belt change for each speed setting, but on most, this took only a minute or less.

Other points to consider

To drill to a specific depth, or just to avoid drilling into the cast-iron table, you'll need to set the depth stop. Eight of these units use a rod with an adjustable stop to limit depth. The adjustable stop is a nut that you spin by hand, but on three models—the Delta, the Porter Cable, and the Rikon 30-240—the nut has a quick-release button that lets you make big adjustments rapidly.

The last two units—the Central Machinery and the Rikon 30-236—have the ring near the crank handle that adjusts depth. These also work well.

While laser pointers are not necessary, I preferred those on the Delta and Porter-Cable machines, which are wired to the machine and mounted on the head. The others are battery-operated and mounted on the post, so if the head of the machine shifts you'll have to re-align the lasers. □

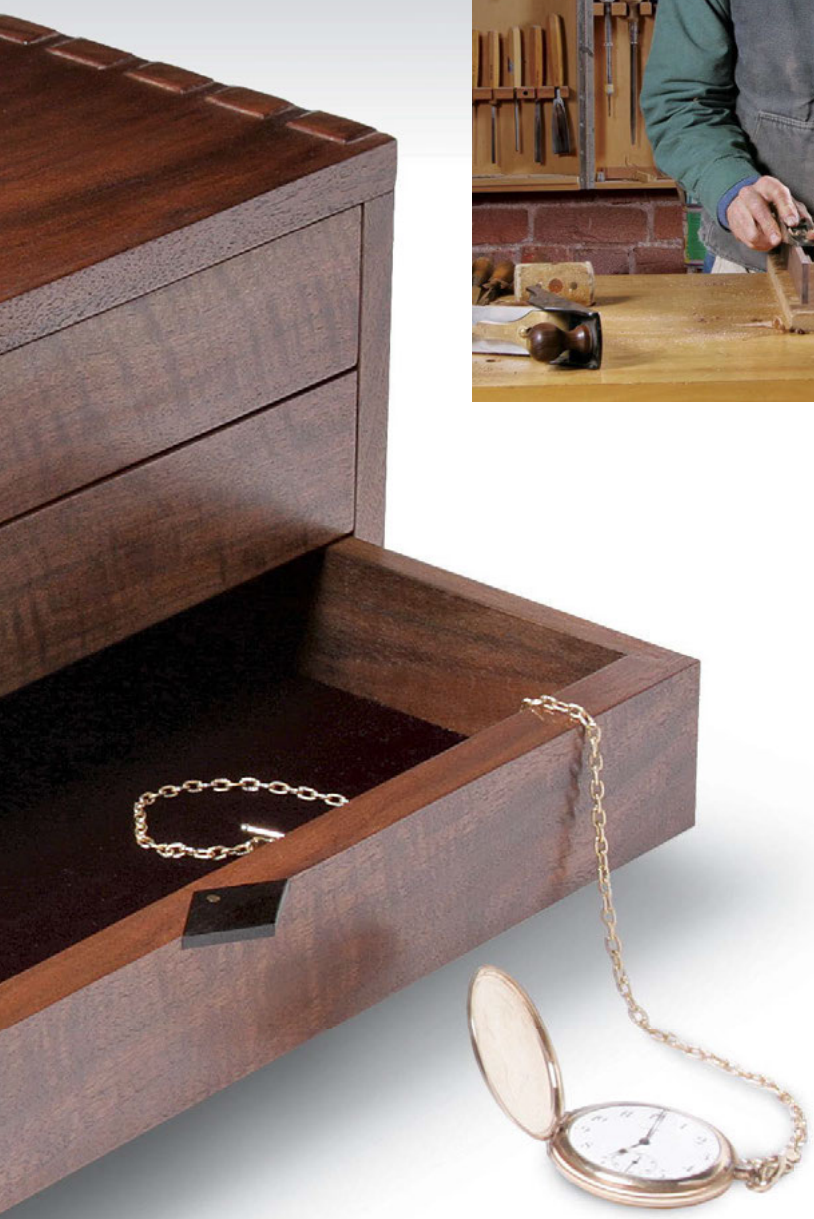
William Peck, a retired engineer, is the FWW shop manager.

Build a Collector's Case

Basic project is loaded with character

BY GARY ROGOWSKI

Photo, this page: John Tetreault



Is it really the devil that's in the details, or is it the angels? In this little collector's case, the details make it stand out. Protruding, shaped dovetail joints, side-hung drawers to keep a low profile, and inlaid pulls all help this piece create a great overall impression.

Even with all the careful touches, the case is simple to construct. Almost all the joints are cut with a router. I use a commercial jig to cut the dovetailed case corners, and I make them stand out with a little handwork.

I built the case and drawers from black walnut. If you need to glue up boards for the case, pay attention to grain and color when you match them up. The drawer fronts should be ripped at the bandsaw from a single board with attractive figure. For the back, I used reclaimed water-tank redwood, which I kept fairly thick. I rabbeted the edges to create a raised panel.

To avoid marring the proud joinery details later, plane, scrape, and lightly sand the case pieces inside and out before starting work on the dovetails.

A jig makes dovetails snug and quick

Naturally, working with a router jig makes quick work of case dovetails, even when it comes to layout. For both tails and pins, you just mark the work and align the jig on the first piece to establish the setup for the remaining cuts.

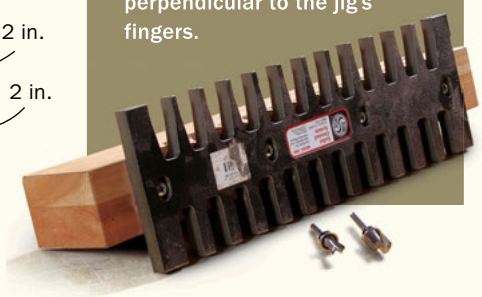
Begin with the tail boards. Set your router-bit depth to match the thickness of the stock plus the thickness of the template. To this, I added 3/32 in. for the amount I wanted the joints to protrude. Next, mount the piece in your vise, end grain up, and strike a centerline on the end of the board. Now clamp the straight-fingered jig to the work-piece, aligning its center with the mark. Last, snug a stop

A case for details

This simple chest, proportioned to sit atop a desk or dresser, becomes a handsome display piece through smart details: Proud dovetails add depth and character, side-hung drawers show continuous grain across their fronts, and inlaid pulls hint that the drawers contain beautiful things.

THE KELLER WAY OF DOVETAILING

The Keller jig is a sturdy, flat plate of composite material with two templates, one each for pins and tails. It comes with straight and dovetail bits that are guided by bearings. Attach a clamping cleat of long, square stock, making sure its reference faces are perpendicular to the jig's fingers.



Photos, except where noted: Steve Scott; drawings: Christopher Mills

TAILS FIRST

THEN PINS

Set up and cut the tails. *After marking a centerline (above) and aligning the template (right), clamp the jig in place and cut the tails (below). The stop block clamped to the cleat helps locate the jig for the remaining cuts.*

Transfer the layout. *Carefully scribe several tails onto the pin board to help locate the jig (above). Align the jig so that the edges of the fingers are tight against the scribe lines (left). Then rout the pins (below).*

block against the end of the workpiece and clamp it to the jig's wooden cleat. After routing this first set of tails, the block will serve as a reference for locating the jig for all of the remaining tail cuts.

With the dovetail bit installed and set to the proper depth, set the router on top of the template to begin cutting. The bit's guide bearing is sized for an exact fit between the jig's fingers, so guiding the router is straightforward. Take care, though, not to lift the router or you risk damaging the jig.

After cutting the first set of tails, unclamp the jig, flip the board, and secure the jig to cut the tails on the opposite end. Finally, repeat the steps for the second tail board, using the stop block to

Assemble the case

Dadoes hold the drawer runners. *Each cut is stopped at both ends, so limit the travel of the workpiece with blocks on the infeed and outfeed fences. Start the cut with the piece against the infeed stop and slowly lower the work onto the spinning bit. Set the bit to the cut's full depth but use a hardboard shim on the tabletop to enable a shallow first pass.*

Square up. *Scribe a line to mark the front end of each dado, then use a chisel to chop the routed ends square.*

Install the runners. *To account for wood movement, Rogowski glues only the first 2 in. of the runner and secures the rear with a screw in a slotted hole.*

locate the jig for each set of cuts. After cutting the tails, transfer the locations of a few of them to the pin boards with a sharp pencil. When you clamp the pin template in place, it should be easy to align the jig with these layout lines. If you've attached the jig in the right spot, the fit should be perfect. Install the straight bit in the router and set its depth, remembering the extra 3/32 in. needed to make the pins stand proud. Take one practice pass before trying it out on your good stock.

Outfit the interior before gluing up

The side-hung drawers slide on runners attached to the case sides. I seat these runners in stopped dadoes cut at the router table before gluing up the case. The front of the dado stops 1 in. from the front edge of the case and 5/8 in. from the rear, where it intersects with the groove for the back. Clamp a pair of stop blocks to the router table's fence, and make the 1/4-in.-deep cuts using a 1/2-in. straight bit (above). Afterward, use a marking gauge to scribe the end lines at the front, and then square them with a chisel.

Cut the stopped grooves for the back next. I make them 5/16 in. deep, and I make the rabbet cut into the back the same size.

Mill up the drawer runners slightly oversize, then plane each one for a snug fit in the dado. To allow for cross-grain movement with the sides, I glue only the front 2 in. of each runner, attaching the rear with a screw in a slotted hole.

With the runners installed, chamfer the proud ends of the dovetails with a block plane and chisel, and dry-fit the case. As a last step prior to glue-up, I pre-finish

Prepare for glue-up. *Lightly chamfer the ends of the pins and tails (far left), and apply finish to all surfaces that won't receive glue, including the end grain on the tails (left).*

Glue up the case. *Slide the rabbeted back into place after attaching the top and bottom to the first side.*

the case pieces, inside and out, with shellac. To avoid squeeze-out, I paint the glue carefully on each pin using a narrow piece of veneer. Start by gluing the top and bottom to one side, then drop the back into position and glue up the remaining side. Secure the whole assembly with two clamps each along the top and bottom of the case. Protect the case sides from dents with cauls set just inside the joinery.

Assemble the drawers

The drawer boxes go together easily. Grooves cut into the drawer sides allow them to slide on the case-mounted runners. I make the bottoms from plywood and line them with velvet over a layer of acid-free mat board.

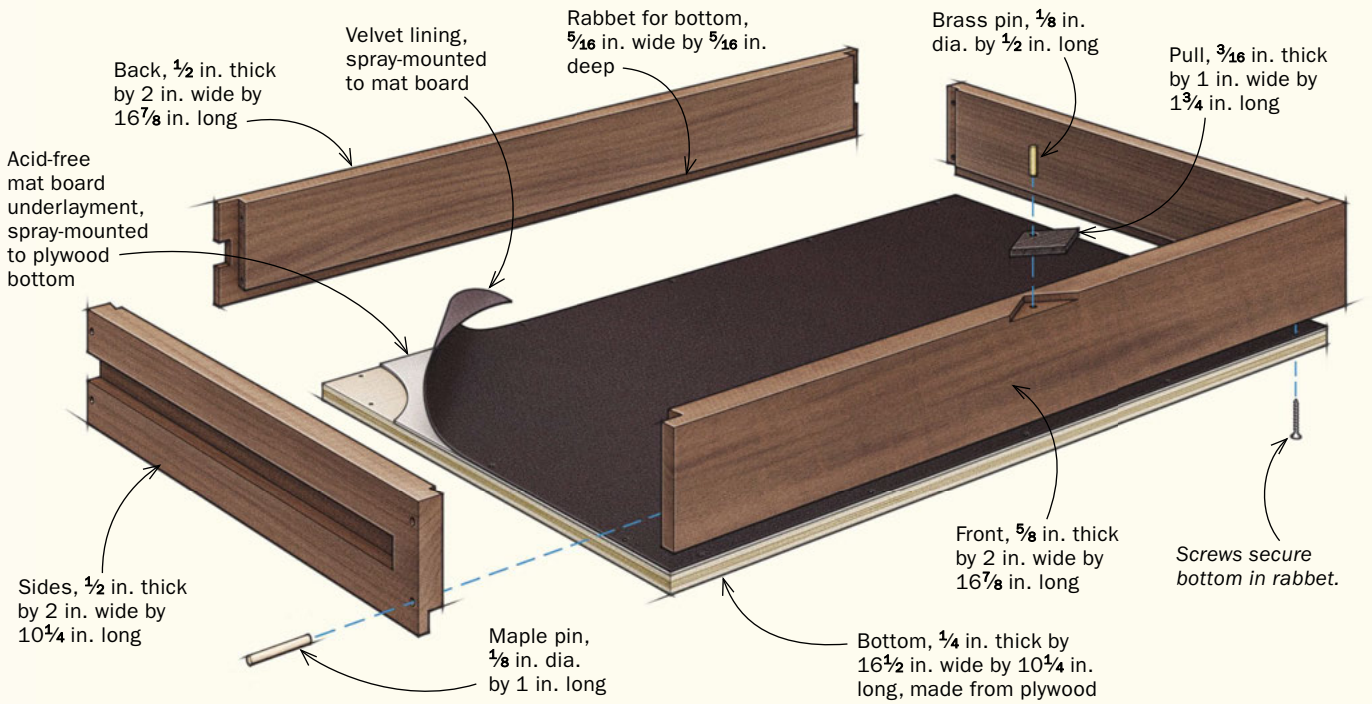
Start by cutting the drawer fronts to exact length. Adjust them to the case by hand-planing to fit with a low-angle plane. The fit should be tight. Size the height of each front so that all three drawers can fit into the opening at once, but just barely.

To join the drawer fronts and backs to the sides, I use an easy-to-assemble rabbeted dovetail joint that can be cut quickly on the router table (see photos, p. 60). I start with the fronts and backs, using the tablesaw first to cut away the bulk of the waste from the rabbet. Then, at the router table, I make a light cut with the dovetail bit to give the rabbet its angled cheek.

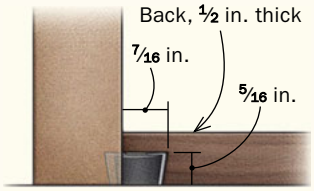
For the drawer sides, leave the bit depth unchanged and use test cuts to adjust the fence setting for a proper cut. You want the drawer side just proud of the front when the joint comes together (see photos, p. 60). You'll plane it flush later.

To maximize storage space in the shallow drawers, I screw the plywood bottoms into rabbets rather than setting them into a

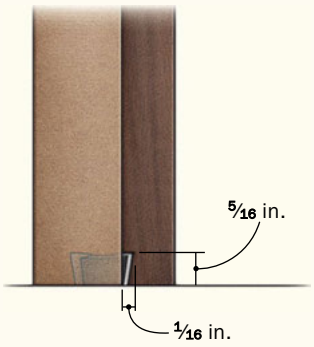
Build and fit the drawers

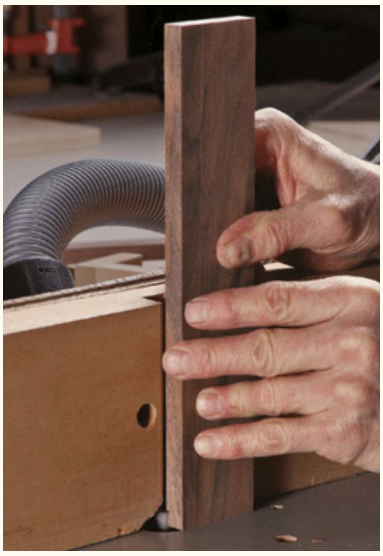


Rabbet the front and back. *With most of the waste removed at the tablesaw, Rogowski shapes the rabbet at the router table using a dovetail bit.*



Cut a half tail on the drawer side. *Adjust the fence for a light cut and run the stock vertically past the bit. Leave the bit height unchanged to match the depth of the rabbet.*





Test the fit. *Your half-tail should be shallower than the one on this test cut, so the drawer side stands just proud of the end grain of the front.*

Glue up the drawers. *Use cauls, apply even clamping pressure, and check for square.*

Reinforce the joinery. *To add strength and a decorative touch, Rogowski seats two pins made from maple through the drawer side at each corner.*

Rout the runner grooves. *Make them in two passes, shimming the fence for the first pass. Aim for a tight fit.*

Fit the drawers. *Plane the faces of each drawer side until the drawer slides smoothly into its opening. Then plane the bottom edges of the drawer sides, and the top and bottom edges of the drawer fronts, to adjust the gaps between the drawers.*

groove. Cut the rabbets at the router table and then glue up each drawer. I reinforce and decorate each corner joint with maple pins.

To rout the stopped grooves for the drawer runners, use a setup piece milled to the same width as a drawer side. Position the scrap inside the case and mark it with the location of the runner. Make test cuts until you cut a groove that fits the runner with just a touch of up-and-down play. Now you're ready to groove the real drawers. Set the stop on the fence to cut each groove a little short at the front end. Also, leave the bit depth shallow at first and adjust using multiple cuts until the drawer just slides in. Use a chisel to square the stopped ends of the grooves. Handplane the faces of the drawer sides until they slide sweetly on their runners. Then plane the top and bottom edges of the drawer to adjust the gaps between drawers. Finally, plane the drawer fronts as needed to bring them flush with one another.

Make and attach the pulls

The final touch is to inlay the pulls. I cut the diamond shape on the tablesaw using an angled stop block and a hold-down stick. I cut all the pulls, sand or plane them to shape, and then scribe the shape on each drawer front. I rout the insets and clean up the corners with a sharp chisel. Glue and clamp the pulls in place. After they've dried, add a small brass pin to each pull. □

Gary Rogowski is the director of The Northwest Woodworking Studio, a school for woodworkers in Portland, Ore.

The Power of the Pull Stroke

One craftsman's passion for Japanese handsaws

BY ANDREW HUNTER

I must admit I'm reluctant to present myself as an authority on Japanese saws. I've never been to Japan, and I've never trained with a Japanese woodworker. If I have an excuse for writing about Japanese saws it could be simply that I love using them. Or that my perspective might be helpful: I'm an American who taught myself to use Japanese tools by watching and listening to and learning from the tools themselves.

My first experience as a woodworker was in my senior year of college, when I built myself a bookshelf. Made with a circular saw and a handful of nails, it wasn't the finest thing, but I enjoyed making it so much I was convinced I'd found my career. Soon afterward I bought my first collection of hand tools at the local hardware store—a Stanley handplane, a set of blue-handled Marples chisels, and a double-sided Japanese saw. It was a mixed bag of traditions: American, English, Japanese. I opened every book on woodworking I could get my hands on, learning from anybody who had something to offer.

I paid attention to how the wood responded to the tools and how the tools responded to me; eventually the three of us learned to get along.

Eventually I came across Toshio Odate's book, *Japanese Woodworking Tools: Their Tradition, Spirit and Use* (Linden Publishing, reprinted 1998), and it resonated right through me. I was immediately drawn to the beauty of the tools, and Odate's stories of his apprenticeship in Japan and his crystal-clear explanations of Japanese tools and traditions inspired me enormously. I was in my 20s, searching out what I wanted to do in this world, and it was his book, in part, that led me to create a self-directed apprenticeship to teach myself to use Japanese tools. Most important, Odate's book taught me to be patient—to master steps 1 through 9 before attempting step 10.

Having acquired a basic understanding of Japanese tools from reading, I taught myself to use them through trial and error. I paid attention to how the wood responded to the tools and how the tools responded to me; eventually the three of us learned to get along.

As much as I love Japanese tools and techniques, I'm not a purist. My methods are a mixture of Japanese and Western ways of working. Japanese craftsmen may be comfortable working on the floor, for instance, but I was uncomfortable trying to adapt to this. As a result, the postures I use, along with many of my techniques, are a compromise between the advantages of the Japanese approach and the ability of a Western-trained body and mind to adapt.

How to handle a Japanese saw

Japan's is the only culture in the world to have developed its saws to cut on the pull stroke. In the rest of Asia, as in the West,

JACK OF ALL KERFS

Japanese handsaws are known for their extremely fine cut, but they're equally valuable for their versatility. In addition to being superb joinery saws, they are up to the tasks of rough ripping, quick crosscutting, and flush trimming. Ryoba saws—two-sided saws with crosscut teeth on one edge and rip teeth on the other—are especially versatile.

Photos, except where noted: Jonathan Binzen

RIPPING WITH A JAPANESE SAW

No vise required. *Low horses provide a convenient way to use your body weight to secure the workpiece as you cut on the pull stroke. For a smooth start to a ripcut, begin at the heel of the blade—where the ripsaw's teeth are finer—and with the handle raised only slightly (top left). For a faster cut once the kerf is established, raise the handle and cut with the larger teeth at the middle and toe of the blade (bottom left). If the kerf should close, tap in a wedge to kept the blade from binding (above).*

a saw cuts when pushed. The genius of the Japanese approach is that pulling the saw through the wood puts the blade in tension. While the blades of Western saws must be beefed up to avoid buckling as they're pushed, in Japanese saws the steel can be very thin—making for a much narrower kerf and less resistance, a combination that improves both speed and accuracy. In addition, the steel can be harder, allowing sharper teeth and a finer cut. The tooth pattern of Japanese crosscut saws is also unique. Each alternating tooth has a three-bevel profile, ideal for cleanly scoring the end-grain walls of the kerf and releasing the chip between.

With its thin blade and sharp teeth, a properly set Japanese saw will cut a straight, clean line with minimal effort. But don't apply too much force—use fingertip pressure and let the teeth do the work. The same qualities that make these saws work so well on the pull stroke leave them vulnerable when pushing; the hard, thin steel is brittle and will break before it bends, so use a very light touch on the return stroke and be ready to release pressure if the saw catches.

Start each cut by placing your thumb at the entry point and using it to guide the saw. Hold the saw at a low

The impact of Japanese hand tools

I don't use my hand tools out of nostalgia. I use them because they make my work better. They offer precision that my power tools can't match, and with hand tools my work is not limited by the capabilities of my machines—if I can draw a line I can cut it. There is no need for flat reference surfaces or square edges. This allows the design to be what looks and feels good, not what is easy to machine. Using Japanese hand tools doesn't mean I have to build in a Japanese aesthetic. I do like the simple, clean lines in Japanese work, but that same honest, unadorned look is at the heart of other furniture styles I've built in, like Mid-Century Modern, American country, and classical Chinese (opposite page).

New angle on joinery. *Angling the workpiece up on one horse makes it simpler to follow layout lines on the end grain. Begin the cut at the back edge (above) to establish the kerf, then angle the saw back toward you to continue the cut (right).*

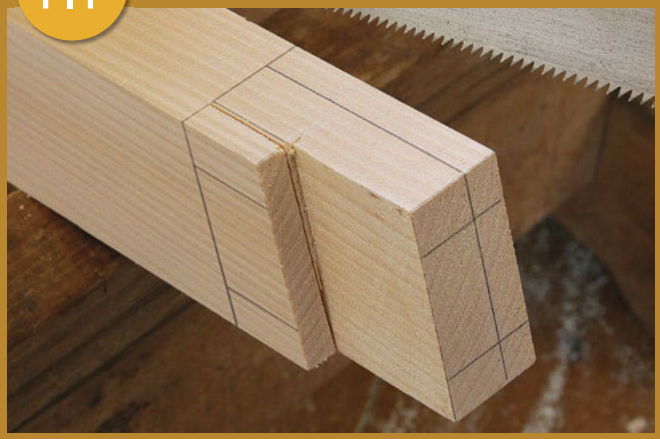
angle to the workpiece as you begin; this will engage more teeth and give you more control. As you progress, raise the handle to a higher angle, which engages fewer teeth and requires less force. Concentrate on cutting straight and maintaining smooth, even strokes. Alignment of the saw at the start is critical, because you shouldn't steer a Japanese saw once you've begun the cut. These saws cut in straight lines only. If you find yourself off course, either try to widen the kerf by sawing in again from the top, or cut away the waste if possible and begin anew just next to the miscut.

Grip: one hand or two

Japanese saws are sometimes gripped with one hand, sometimes with two. Smaller cuts where accuracy is paramount are typically made one-handed, with the hand held back on the handle. This positioning makes for more sensitivity to the cut and allows you to sight the length of the handle to see that your motion is straight. When sawing with one hand, I use a handshake grip with my index finger extended along the top of the handle. You want the

TIP

FIXING A FOUL-UP



You can't steer a Japanese saw the way you can a Western one. This puts a premium on getting the cut started right. If the cut does go off-line, it's best to stop sawing, cut off a waste piece, and establish a new kerf.

Bottom photos: John Waldie

Sight for a straight cut. *For fine cuts, saw one-handed, gripping toward the end of the handle and sighting to be sure the handle and blade remain in line as you saw.*

Thumb stop. *Use your thumb to guide the blade as you make the first few strokes.*

Stable setup. *Holding the workpiece against a pair of benchdogs with your free hand provides plenty of stability as you crosscut on the pull stroke.*

handle and the top edge of the blade to move in a straight line, while keeping the face of the blade in plane with the cut, and all the while keeping an eye on the line. It is truly a state of Zen, seeing everything without focusing on anything.

The saw's long handle also allows for a two-handed grip when making larger, more aggressive cuts. For optimal control and power when using the two-handed grip, separate your hands, one at the front of the handle, the other at the back.

Posture and work holding

Although a light touch is best with Japanese hand tools, working with them is still a very physical activity. I once watched a highly skilled Japanese craftsman in California doing a demonstration, and his movements reminded me of a martial artist. He generated much of his power with his legs, and it was instantly clear to me that I was not using my whole body as I worked. After that I started taking tai chi so I would be more nimble and more aware of my whole body while I worked.

Like most Japanese craftsmen, I rarely use vises when I'm sawing. My posture and work-holding method vary, depending on the type of cut I'm making. For more aggressive cuts, like long rips, I recommend placing the workpiece on low sawhorses and holding it in place with your foot. The teeth of a ripsaw are smaller at the heel, so start the cut there. Once the kerf is established, engage the full blade. Pull the saw in toward the center of your chest while counteracting the upward force with your body weight. This posture allows for the greatest power. Use the large muscles of your abdomen to draw the saw in. In this bent-over posture, support yourself with the muscles of your legs, not your back.

For smaller ripcuts, such as the cheeks of tenons, it is helpful to elevate the end to be cut on a single low sawhorse, allowing a clear view of the layout lines on the end-grain surface as well as on the face of the board. Here again, your foot provides the downward pressure to hold the workpiece still and to counteract the pulling force of the saw. Like Japanese craftsmen, I wear slippers while I work so the wood is not marred by grit from outdoors. Alternately, you can protect the workpiece with a cloth.

For maximum precision in smaller crosscuts or ripcuts, I'll often place the workpiece on the bench, brace it against a pair of dogs, and hold it in place with my free hand. I make these cuts while standing, pulling the saw up through the wood.

For repetitive short cuts such as for dovetails, I'll place the workpiece flat on my bench and pull downward through the wood to make the cut. This way, the sawing action pulls the workpiece tight to the bench, eliminating vibration—and the need for a clamp or vise. I can easily hold the piece still with my free hand

The lowdown on dovetails. *Hunter does some repetitive joinery while sitting on a low block or stool. This posture brings his eye close to the layout lines, and the downward stroke pulls the workpiece to the benchtop, eliminating vibration.*

as I saw. For this type of cut, I saw while kneeling or sitting on a low block beside the bench. This puts the workpiece at eye level, permitting me to easily see the layout lines on both faces of the board. It also lets me work far longer without fatigue. Although the workpiece is easier to stabilize when cutting downward in this way, you do sacrifice some control. It's easiest to control a Japanese saw when the cut is progressing toward you. Here it is progressing away from you. I only use this technique for short cuts, say 2 in. long or less.

Buying Japanese saws

The tradition of saws made by hand in small shops is still alive in Japan. These tools were originally designed for craftsmen who studied for many years how to use them and wanted to push them to their limits. And the balance of performance and convenience still tends to lean toward performance in saws made in these shops. The blades on craftsman-made saws are forged from high-quality steel that will take a sharper edge but is brittle and more vulnerable to breaking. The blades are hand-scraped so the sides are slightly dished, reducing friction in the cut.

One of my first really good Japanese saws was a handmade dozuki. It had very fine, super-sharp teeth on an ultrathin blade. This saw quickly taught me how insensitive I was. I had to stop using it; it was evident that if I kept using it without the necessary

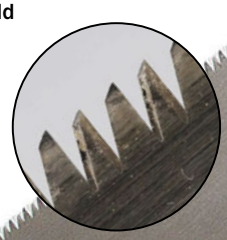
A good guide. *The azebiki saw, with its short, wide blade, easily follows a guide block for straight or angled cuts.*

A few saws to start with

Japanese saws are very specialized. Whether you are ripping or crosscutting, working hardwood or softwood, making aggressive cuts or fine, there is a specific Japanese saw designed for each cut. There are even saws for cutting plywood. And a saw designed for a specific type of cut will always outperform a general-purpose saw. That said, you can get a lot of work done with just a few versatile saws.

RYOBA

A ryoba is the first Japanese saw I recommend buying. With crosscut teeth on one edge and rip teeth on the other, the ryoba is the workhorse of Japanese saws, suited to everything from rough carpentry to fine furniture work. One-sided ripsaws and crosscut saws are also available, but the ryoba puts the two together, providing cost savings, convenience in use, and little downside. One minor disadvantage of the ryoba is that on deep cuts the teeth of the opposite edge will enter the kerf and can cause some tearout. If the quality of the cut is critical, you should use a one-sided saw, or open the kerf with a wedge.



CROSSCUT TEETH

RIP TEETH

Versatile virtuoso. *The ryoba saw has crosscut teeth on one edge and rip teeth on the other, making it extremely handy. Like other Japanese saws, ryobas are available in versions expressly for hardwood or softwood.*

DOZUKI

Your next purchase might be a pair of dozuki saws. Suited for the finest work, the dozuki has an extremely thin blade supported by a heavy steel spine. There is very little set to the teeth, and the saw leaves a remarkably clean surface. Dozukis come in both rip and crosscut versions, and I recommend buying one of each. One limitation of the dozuki, as with any backsaw, is that its depth of cut is limited by the spine.

King of the clean cut. *Like Western backsaws, the dozuki, with its heavy spine, extremely thin blade, and small teeth, is made for the finest work.*

skill I would ruin it. Modern factory-made Japanese saws strike a balance that is far more inviting to the new user. By backing off on the hardness of the steel, manufacturers make saws that are easier to use for the beginner while still delivering the advantages of cutting on the pull stroke.

The blades of factory-made saws are of more forgiving, softer steel, and often only the teeth are hardened. Although these saws lack the rigidity and subtle profile of the more expensive saws, they are still very effective and I use them for much of my work. Most of these inexpensive saws have replaceable blades. Should they be misused or become dull, they are easily replaced. When learning, it is better to go through a few replacement blades at $25 apiece than to break a high-quality saw, wasting your money and dishonoring the skill of the maker.

In general, the geometry of Japanese tools is more aggressive than in Western tools. Saws have longer teeth with more radical rake angles and sharper fleam angles. Their extrahard teeth are designed to cut cleanly and quickly. But all this comes at a cost. The hard steel is brittle, and the longer, more aggressive teeth are more likely to break if used incorrectly.

One misconception about Japanese saws is that they are only suited to soft woods. That's not true. Most of these saws are available in versions intended specifically for sawing hardwoods or softwoods. Hardwood saws have shorter teeth filed to a less aggressive pitch than softwood saws. The number of teeth per inch coincides with the length of the saw and determines the coarseness of cut—shorter saws have more and smaller teeth, producing a finer cut.

There's a wide variation in the price of Japanese saws. Factory-made saws range in price roughly from $30 to $75, and that includes a lot of great saws. For a handmade saw, you can expect to see prices starting around $75 and going up to many hundreds. All of the saws I use cost less than $200, and some of my most-used saws were less than $50.

If you own a saw with a handmade blade and it is dull or out of straight, it can be sent back to the maker for retuning. Most reputable dealers will offer this service.

To be honest, when just learning to cut on the pull stroke, it is usually not the quality of the saw that will keep you from making a straight cut. It takes time to get used to this mode of working. Be patient and remember that the best thing you can do is relax. A few deep breaths before beginning a cut will go a long way. □

Andrew Hunter makes custom furniture in Accord, N.Y.

Quick switch. *Many Japanese saws have replaceable blades, and switching to a new one takes a minute or two. Old blades can be kept and remounted for cutting plywood or gnarly boards, or they can be cut up and used for scrapers.*

AZEBIKI

The third type of saw I'd recommend is an azebiki. Available in single-sided or double-sided versions, the azebiki has a curved blade that enables you to start or stop a cut in the middle of a board. The blade is short, so following a guide block is simple, making this a great choice for cutting dadoes and sliding dovetails, including stopped ones. Because of its short blade, the azebiki is harder to sight, and so for unguided cuts it is less accurate than longer saws.

Stop-cut specialist. *The azebiki saw's short, curved blade enables it to start and stop cuts in the middle of a board, as when making stopped dadoes or sliding dovetails.*

Rout Perfect Hinge Mortises

A simple jig guarantees headache-free installation

BY MATT KENNEY

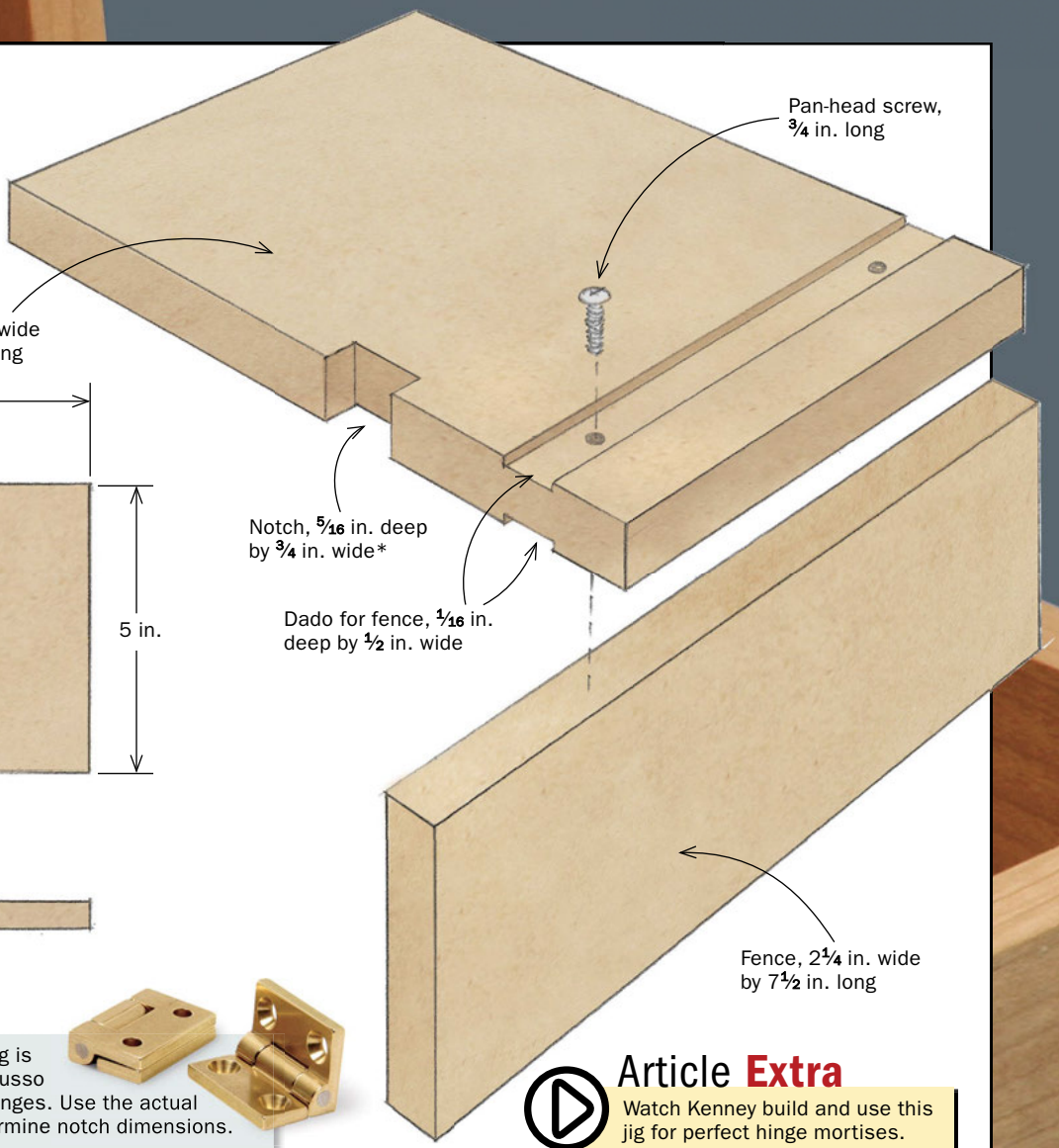
If you've ever built a box with a hinged top, you know how tough it is to get the hinge mortises right. Any misalignment in the top or bottom mortise can cause the hinge to bind or leave a gap between the top and bottom when the box is closed. I've made a lot of hinged boxes, and I used to have trouble with the hinge mortises whether I cut them by hand or freehand with a router. Not anymore. Now I use a simple jig that allows me to rout each mortise quickly and then square it up with a chisel. They end up the correct length, width, and depth, and the bottom and top mortises are always aligned perfectly.

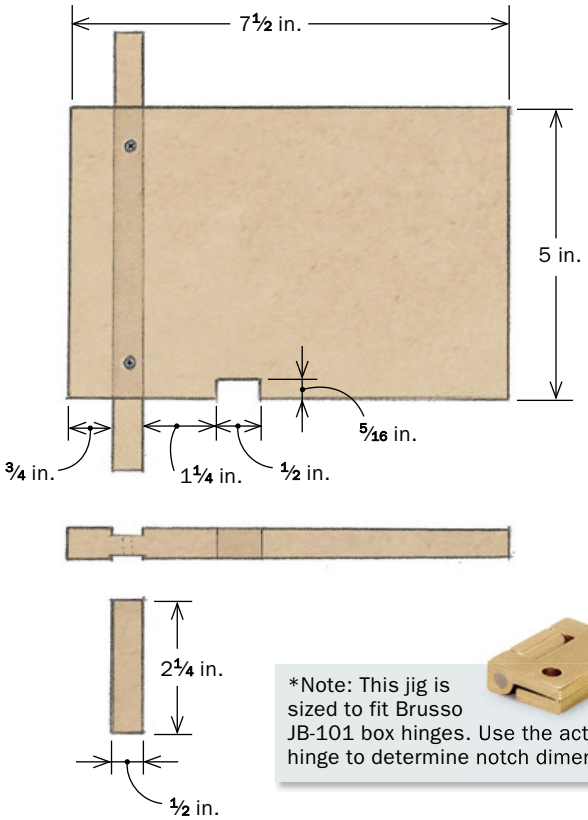
The jig is easy to make from inexpensive ½-in. MDF. The plate has a notch the exact size of the hinge leaf, and takes into account the location of the hinge barrel, which is the rotational axis of the lid. If the barrel is not outside the edge of the box, the lid

Photos: Dillon Ryan; drawings: Kelly J. Dunton

Box-hinge helper

Made from ½-in.-thick MDF, this little jig helps you rout perfectly aligned hinge mortises for boxes. The key to its reliability is using a constant reference face for each side.



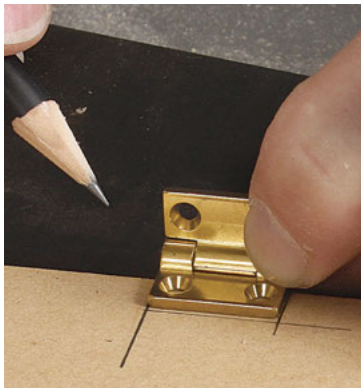


*Note: This jig is sized to fit Brusso JB-101 box hinges. Use the actual hinge to determine notch dimensions.

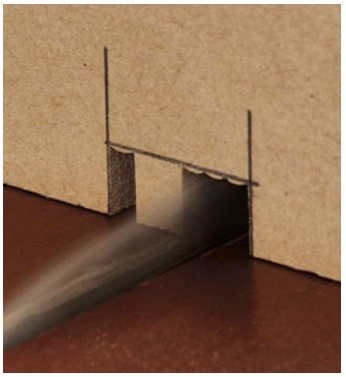
Article Extra

Watch Kenney build and use this jig for perfect hinge mortises.

SIZE THE JIG TO FIT YOUR HINGE



Lay out the hinge notch. *After sizing the plate and cutting the dadoes for the fence, mark the notch directly from the hinge. Don't forget to account for the barrel.*

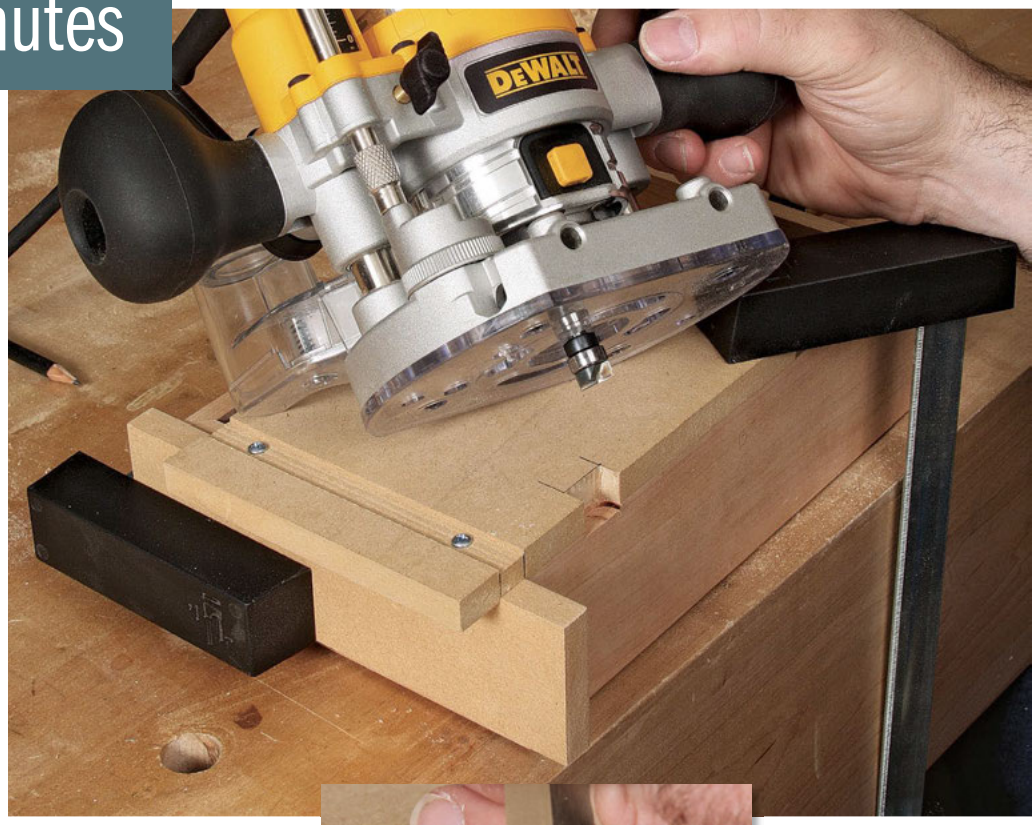


Then clear it out. *Cut the hinge notch at the tablesaw with a miter gauge. Make the outside cuts first (leave the layout lines) and then remove the waste in between. For a flat bottom, slide the piece sideways over the blade while holding it against the miter-gauge fence.*

A mortise in minutes

1. ROUT AND SQUARE THE MORTISE

Set the depth. *With the jig plate on a flat surface and the router resting on it, plunge the bearing-guided pattern bit through the notch until it bottoms out and lock it in. Then place a hinge leaf under the depth stop and tighten it in place.*



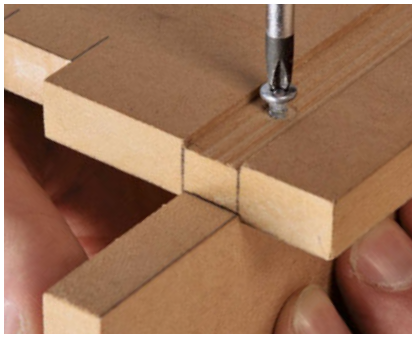
will bind and won't close properly. A small dado on both faces of the plate houses a fence that helps locate the mortise's inset from the box side. You need a dado on each face so that the jig can be used for all four hinge mortises on a box.

My favorite thing about the jig is that it works for any box that uses the same hinge—no matter how big the box is, the hinge can be inset the same distance (1 in. to 1½ in.). Make the jig once, and use it for years to come. □

Matt Kenney is a senior editor at FWW.

Hold down and rout. *Place the fence against the box side and align the edge of the plate flush to the back of the box. Then clamp the jig in place. A quick pass with the router clears most of the waste. Keep the jig clamped in place. Square up the mortise with a chisel (left).*

2. FLIP THE FENCE AND REPEAT



Quick-change fence. *After routing one mortise on the box and one on the lid, simply remove the screws and flip the fence to the other side. The two remaining mortises can now be routed with the same settings as the first two.*

Join the Feast!

Moveable Feast with Fine Cooking returns to PBS TV this fall.
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readers gallery

MICHAEL CODISPOTI
Wellesley, Mass.

Completed over the course of his final year at North Bennet Street School in Boston, Codispoti's Chippendale chair was made from a single 8/4 mahogany board. He tweaked and perfected the back splat design based on motifs derived from a few different antiques. Correct to the Chippendale period, the seat is made of horse hair and cotton batting with fabric stretched over it.

MAHOGANY, PINE, AND ASH, 17D X 21W X 39H

Photo: Lance Patterson

GEOFFREY CARSON
Issaquah, Wash.

This entry bench was built with a nod to the Arts and Crafts movement, specifically the reverse tapered legs found on a side table by noted Czech designer and architect Josef Hoffmann. The seat was inspired by Scott Lewis's cutting boards article in *FWW* #233.

WENGE, BUBINGA, AND BLACK CHERRY,
16D X 66W X 19H

Submissions

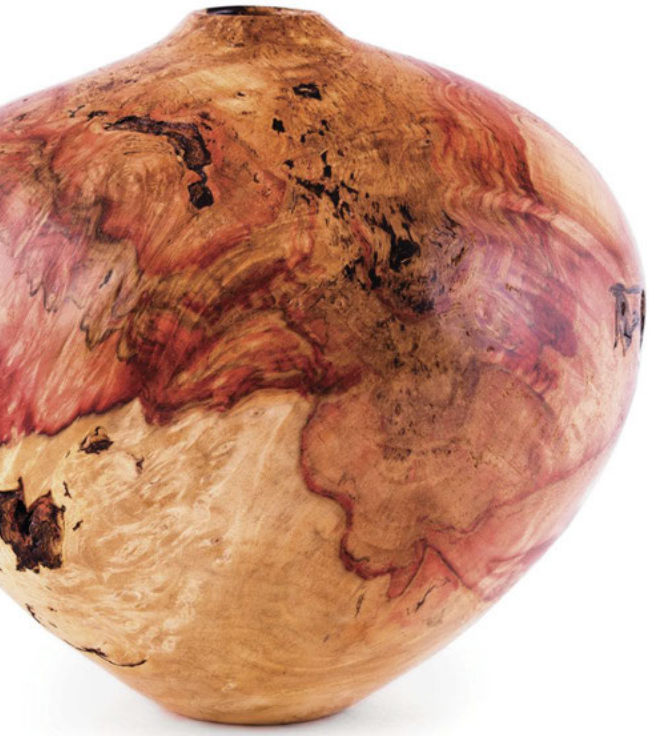
Readers Gallery provides design inspiration by showcasing the work of our readers. For submission instructions and an entry form, go to FineWoodworking.com/rg.

JEFFREY BREEN
Rockwood, Ont., Canada

Built as a 23rd birthday gift for his girlfriend, Breen's jewelry box contains a series of sliding panels for hanging bracelets and necklaces, as well as a removable, miniature chest of drawers with veneered fronts for other items. "I build and restore wooden boats for a living, and smaller projects like this are a great way to get through the slow winter."

BIRD'S-EYE MAPLE, MAHOGANY, AND WHITE OAK, 7D X 17W X 25H

Photo: Patrice Anderson



JOHN COBB
Kentfield, Calif.

Had it not been for Cobb's keen eye for great wood, this colorful hollow form would have never seen the light of day. "I rescued this fantastic piece of box elder that had been casually tossed in an arborist's firewood pile."

BOX ELDER, 9 DIA. X 9H

GEREMY COY
Alexandria, Va.

Coy transformed this small side table by using kumiko latticework instead of solid aprons. The traditional cherry blossom motif is hand cut and pressed into place between the rails. "I specifically selected the cedar used for the kumiko for its tight, straight grain, which emphasizes the pattern before the material itself."

CHERRY AND ALASKAN YELLOW CEDAR, 9¾D X 9¾W X 26H

readers gallery continued

JOHN SHERIDAN
San Francisco, Calif.

Sheridan's bent-laminated chair is in its fourth incarnation. "The curve work is influenced by the experimental plywood bending done at the Bauhaus school in Germany in the 1920s. The frame is pulled from my admiration for Dutch designer Gerrit Rietveld." Shop apprentice Chen Li assisted in the build process.

MAHOGANY, MAHOGANY VENEER, AND POPLAR, 22D X 22W X 41H

Photo: Joe Schopplein

BRANDON O'FLAHERTY
Smiths Falls, Ont., Canada

O'Flaherty built this ring box to house his wife's engagement ring. The burl veneer on the exterior was sanded through to reveal a blackwood trim at the edges. "Not only did I enjoy building this, but the added bonus was she said 'Yes!'"

AFRICAN BLACKWOOD AND MAPLE BURL VENEER, 3D X 2W X 2H

Photo: Melissa O'Flaherty

MIKE ROBERTS
San Antonio, Texas

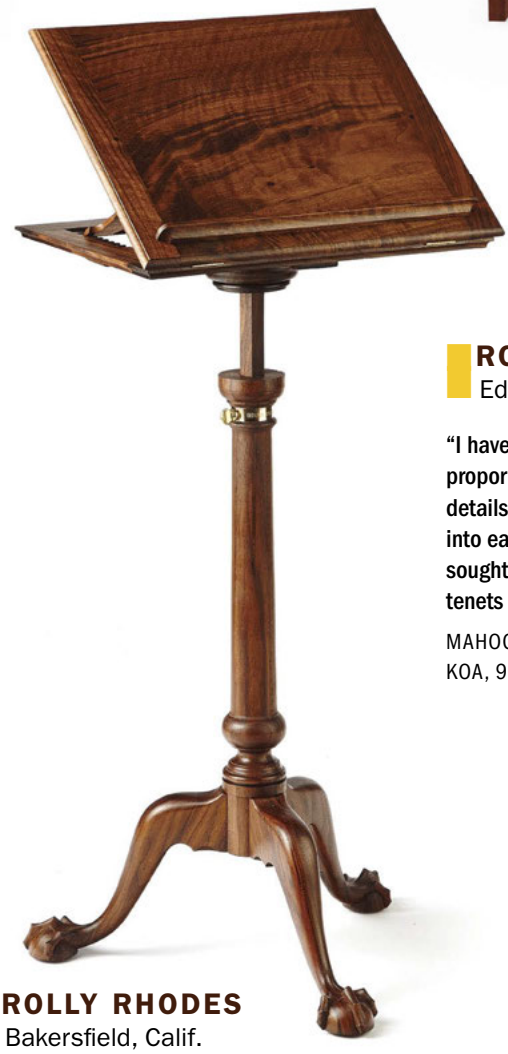
This desk has a shopsawn walnut veneer top with a curved front and sides. The piece won third place and the Woodcraft Sponsor's Award at the 2014 Texas Furniture Makers Show in Kerrville, Texas.

WALNUT AND MAPLE, 32D X 68W X 30H

DAN STROUT
Milton, Mass.

Strout started building this federal sideboard when a local high school student asked if he could shadow the woodworker through a project build and write a paper on the experience. After 300 hours, the piece was complete and the student had a thesis.

MAHOGANY, HOLLY, AND EBONY, 21D X 53W X 39H



ROLLY RHODES
Bakersfield, Calif.

Rhodes built this music stand to celebrate his brother's ordination. The piece is based on a stand he'd seen in the DeWitt Wallace Museum at Colonial Williamsburg. Rhodes requested and was given access to the original stand to take measurements and photos.

WALNUT AND BRASS, 15D X 18W X 33H

ROBERT WHELAN
Edmonton, Alta., Canada

"I have always been inspired by the proportions, attention to grain, and details that James Krenov crafted into each of his pieces." Whelan sought to emulate those design tenets with his cabinet-on-stand.

MAHOGANY, SPALTED MAPLE, AND KOA, 9D X 29W X 59H

handwork

The secret to better chiseling

TAKE LIGHT CUTS TO INCREASE PRECISION AND PRESERVE THE KEEN CUTTING EDGE

BY MICHAEL PEKOVICH

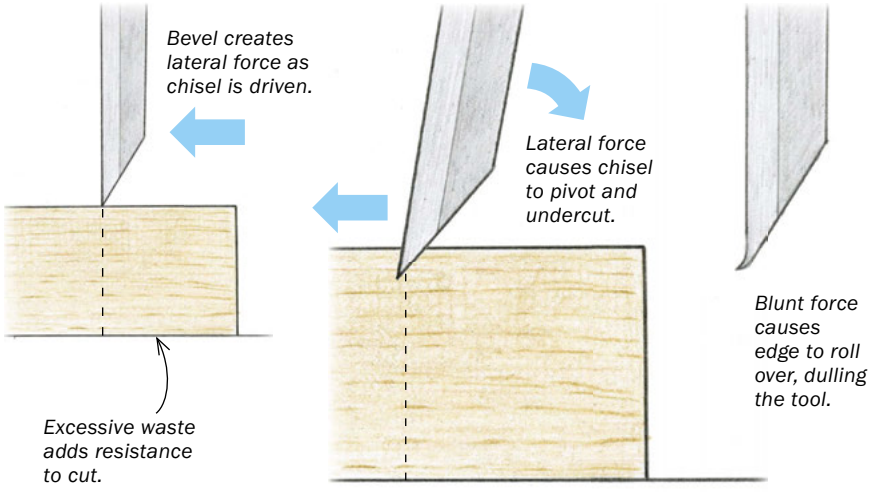
A lot of woodworkers I talk to aren't that happy with their chisels. And, typically, the more they paid for them, the less satisfied they are. The common complaint: "They just don't hold an edge like I thought they would." The problem is often not the chisels themselves, but how they are being used. In short, the chisel is a tool designed to take a thin shaving. When you take heavy cuts, a chisel dulls quickly. But if you stick to thin cuts, the tool will perform wonderfully and stay sharp for a long time. I'll explain why the chisel acts like it does and how to use it for maximum efficiency.

How a chisel cuts—it's all about geometry

Because the chisel is such a familiar tool in the workshop, we tend to take its shape for granted, but it's actually an odd design when you think about it. With a flat back and a steep bevel, the chisel is an asymmetrical tool that imparts

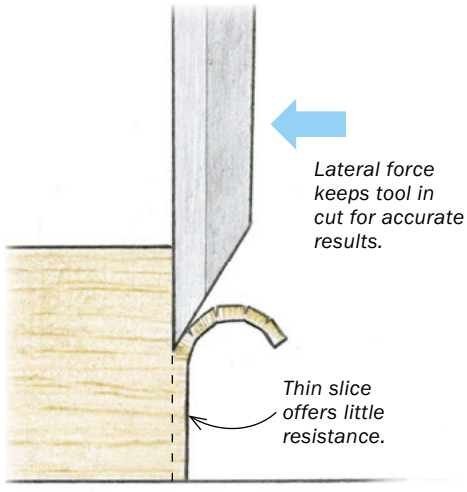
HEAVY CUTS CAUSE HEADACHES

The bevel of a bench chisel is designed to clear waste as the tool is driven. Leaving too much material on the waste side makes the job harder and less precise.



THIN CUTS ARE THE WAY TO GO

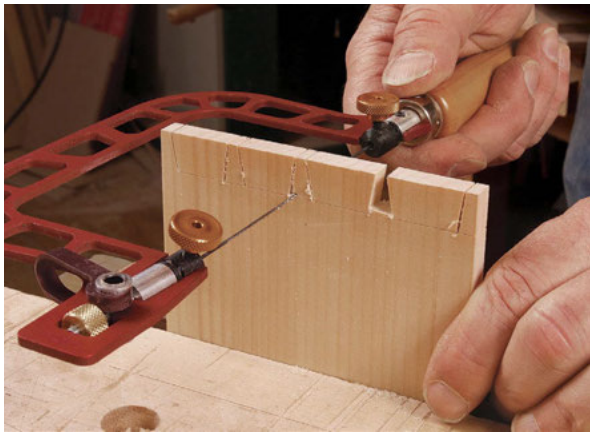
Leaving 1/16 in. or less of waste lets the bevel clear the waste easily and precisely and prolongs the cutting edge.



Photos: Ben Blackmar; drawings: John Tetreault

Get rid of the waste

SAW BETWEEN DOVETAILS

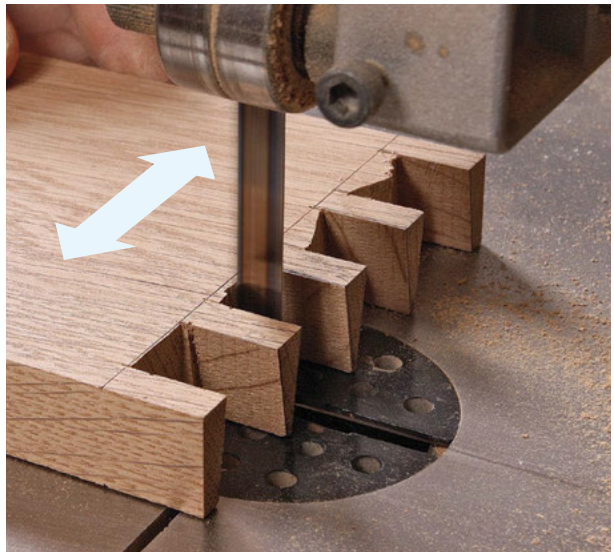


Use a fretsaw for thin stock. *The narrow blade can slip down the sawkerf, allowing you to cut straight across the baseline. Try to leave no more than 1/16 in. of waste.*

For thick boards, go with a coping saw. *The wider blade can power through hard or thick stock, but requires multiple cuts to clear the waste.*

asymmetric forces in use. Simply put, if you place a chisel in a scribed line in the center of a board and give it a whack, a lot of bad things happen. As you chop, the flat back wants to cut straight down, but the beveled edge gets pushed inward by the excess material. This can cause the chisel to pivot and inadvertently undercut the baseline you're trying to chop to, resulting in a gap. Finally, a heavy cut causes the leading edge of the chisel to roll over in the direction of the force, effectively dulling the cutting edge.

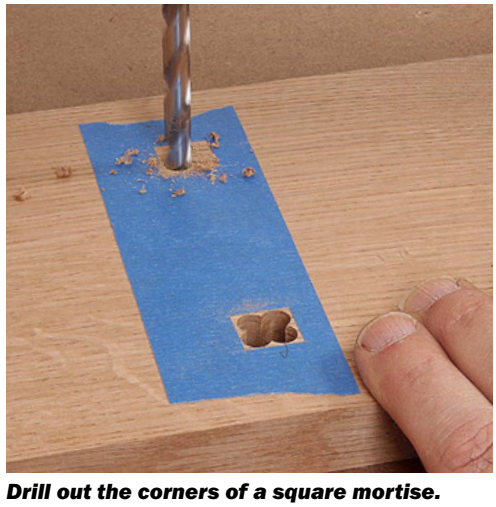
The solution is simply to take a lighter cut, whether paring by hand or chopping with a mallet. A thin slice offers very little lateral resistance, so the



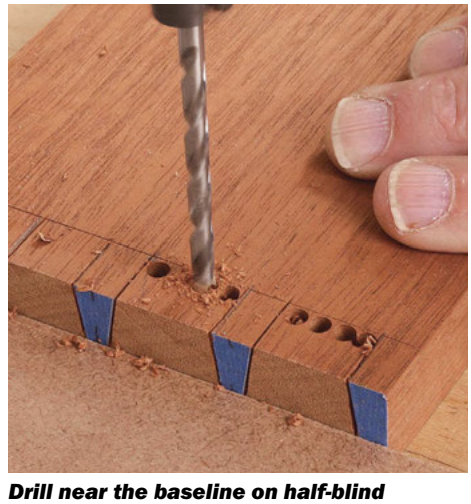
Bandsaw gets you close to the finish line. *Skate the workpiece side to side and slowly chew away to within 1/16 in. of the baseline.*

DRILL OUT MORTISES AND DOVETAIL SOCKETS

Drill in a line for a long mortise. *Use a fence and a bit that's the same diameter as the mortise width. Overlap the holes slightly.*



Drill out the corners of a square mortise. *Drilling multiple small holes rather than one large hole in the center removes more waste.*



Drill near the baseline on half-blind dovetails. *A row of holes makes it easier to remove the waste.*

Grip it low for control. *Pinch the blade near the tip and rest your hand against the stock when placing the chisel.*

CHOPPING

For chiseling to the baseline in thick stock or hard woods, a hammer or mallet can speed the process.

Thin slices, even when chopping. *Work back to the baseline, taking 1/32-in. cuts. Angle the chisel to undercut the joint slightly to ensure the joint seats fully. Work halfway, then flip the stock and finish up from the other side.*

chisel edge remains engaged in the cut for a thin, even shaving. In addition, the edge of the tool will not roll over and dull in use. Note that you need a razor-sharp chisel to take a thin slice, so be sure your tool is sharp before you put it to wood (see p. 83).

Clear the waste to get a head start

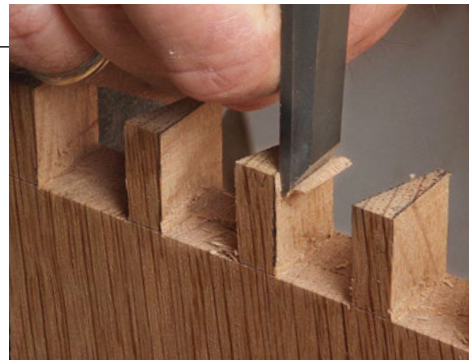
To ensure success, you should remove as much waste as possible before you begin. Depending on the joint, I go about this in a few different ways.

When dovetailing thicker stock, say for casework, I use a coping saw to cut out the waste between the pins and tails. If you don't get as close to the baseline as you'd like, you can remove most of the remaining waste at the bandsaw. Slide the workpiece from side to side using light pressure to scrape to the baseline (see photo, p. 79). For thin stock like drawer sides, it's faster to use a fretsaw. Just slip the thin blade down the sawkerf and cut along the baseline. I try to

PARING

For fine-tuning joinery in any wood, and baseline work in thin stock or soft woods, hand power is all you need.

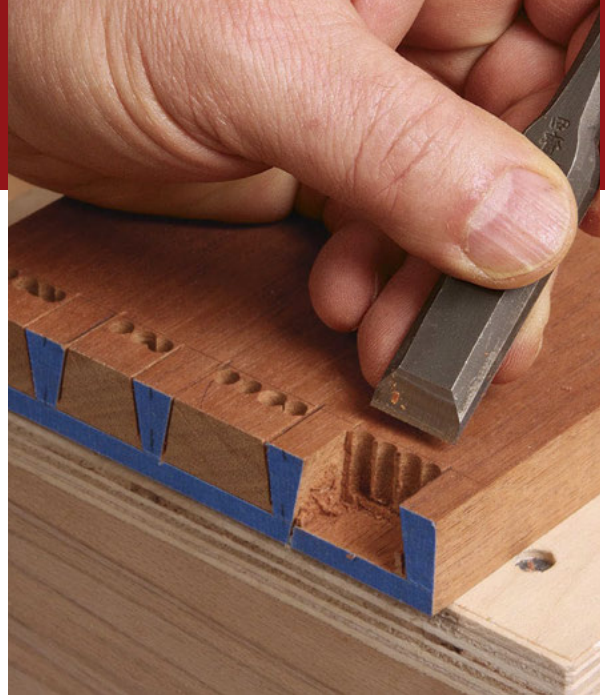
Hand power. *When paring by hand, place the chisel with your forward hand and drive it with your rear hand. Keep your body weight behind the tool to help (left). It is especially important to take thin cuts so the chisel won't bog down in the cut (above).*



Pare down if the grain allows it. *When cleaning up pins, it's easiest to pare straight down (top). To prevent tearout when the grain is angled in, pare side-to-side across the grain (bottom).*

MAKE QUICK WORK OF HALF-BLIND DOVETAILS

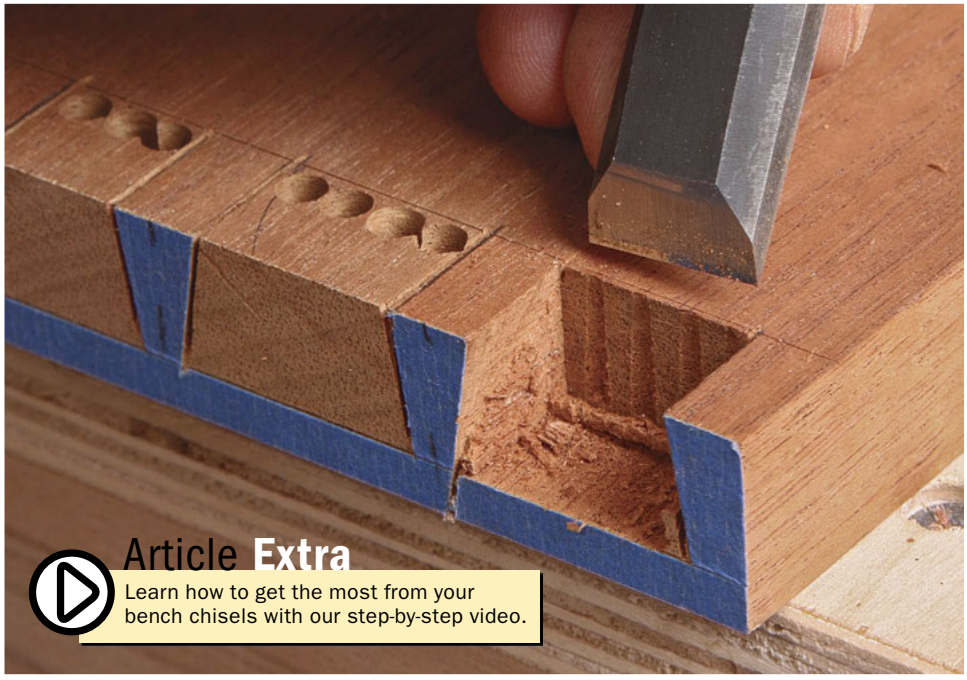
Pop, chop, and pare. *Predrill near the baseline first (see p. 79). Place the chisel at the wide point of the holes where the most end grain has been severed (left) and chop down ⅛ in. Pare in from the end grain to pop out a layer (right) and continue chopping and paring until you reach the bottom of the socket.*



Now work back to the scribe line. *With most of the waste removed, continue toward the shoulder line, taking thin slices as you go (above). Work to within 1/32 in. of the shoulder line before placing the chisel in the scribe line for a final cut (below).*

leave only 1/32 in. to 1/16 in. of waste to chisel away.

Drilling is another great way to clear waste. For mortises, I clamp a fence to the drill-press table and drill one row of holes along the length of the mortise. On half-blind dovetails, drill a row along the baseline while staying clear of the line by 1/32 in. to 1/16 in. There's no need to drill out all of the waste. Once the long-grain fibers are severed, the majority of the waste pops out easily. I use the same technique for through-mortises, drilling holes along the end-grain walls of the mortise.



Paring by hand

There are two ways to chisel through the stock. You can pare by hand using your body to drive the chisel, or chop with a hammer or mallet. Chopping tends to undercut the joint as you cut. To compensate, you must work in from each face. For a truly flat surface, I pare by hand.

When paring, it's important to get your mass behind the tool. When the work is flat on a bench, this means getting over the tool; when it's clamped in a vise, bring your stance lower and wider. In each case, the aim is to start the chisel exactly where you want it and drive it at a precise angle so that it neither skips out of the cut nor digs in too deep.

Sometimes it's necessary to pare along the grain, such as when trimming dovetail walls for final fitting. This can be a little tricky depending on how the grain is running. If it's nice and straight, paring down works well. But if the grain is at an angle to the pin wall, the only option is to pare across the grain.

Techniques for chopping

With a hammer or mallet providing the power, the key is controlling the chisel. Rather than gripping the handle, hold the blade near the tip. Pinch the blade between your thumb and fingers and rest your hand on the surface of the workpiece. This low grip lets you place the chisel more accurately and allows your chisel hand to act as a brake to keep the chisel from exiting the workpiece and contacting the benchtop.

Just as when paring by hand, take thin cuts. Work toward the baseline until you're within 1/32 in. Then place the

chisel right in the scribe line and angle it slightly forward for the final chop. This purposeful undercut helps the joint seat tightly, but you must stop halfway through the cut, flip the workpiece, and finish chopping from the baseline on the opposite side.

On through-mortises and half-blind dovetails, drill a row of holes as shown in the photos. Start chopping at the widest part of the holes and work back to the baseline.

Working this way, you'll be surprised at how little force is needed and how controlled and precise the process is. It's more of a surgical tap-tap-tap than the brute-force excavation that the term "chopping" implies. Once you've cut to the baseline, it's easy to pare the sides of the mortise or dovetail socket by hand. □

Michael Pekovich is a furniture maker, instructor, and FWW's executive art director.

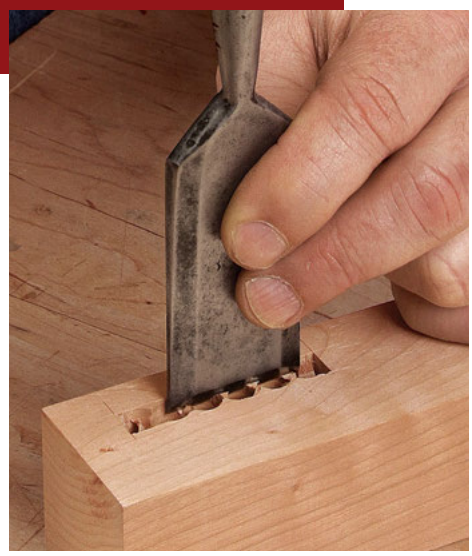
Tenons

Machines handle most of the tenon work, but fine-tuning shoulders is a perfect task for a chisel.

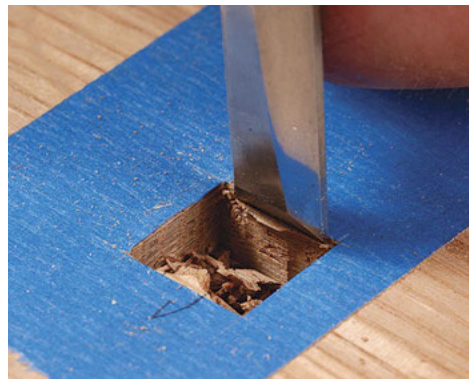
Get low for more power and control. *Widen your stance and use a two-handed grip to lock your upper body into a single unit (left). This lets you drive through the cut using your body mass and maintain a consistent chisel angle for the entire cut. Take narrow passes and register the blade on the previously cut portion of the shoulder for an even cut (above).*

Mortises

Drilling out most of the waste makes chopping mortises fast and precise.



Start at the ends. *For long, narrow mortises, begin by establishing the ends (above). Start chopping at the widest part of the hole where there's the least amount of end wood intact, and work back to the scribe line (above right). With the ends cut, use a wide chisel to cut the long walls. Start at the center and work toward the scribe line, using the drilled holes as a guide to keep the chisel vertical (right).*



Technique is the same for square mortises. *Chop the ends of the mortise first (top), then the sides (bottom). For through-mortises, work halfway down from one face and then flip the stock and complete the mortise from the opposite face.*

Easy method for sharpening chisels

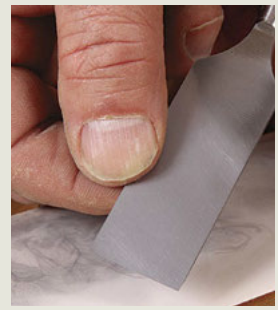
To do good work, your chisel must be sharp. Over the years, I've tried a variety of products and techniques and have settled on a simple method that's fast and reliable. My sharpening kit consists of waterstones in three grits, 1,000, 4,000 and 8,000, as well as an inexpensive honing guide. With them, I can get sharp in just a few minutes.

For a truly sharp chisel, you must flatten and polish the back of the tool as well as the bevel. Depending on the quality and condition of your chisel, flattening the back can take some time and elbow grease. The good news is that it's a one-time effort.

On a new chisel, I start flattening on my 4,000-grit stone. If that stone can't remove all of the mill marks, I go to a coarser grit. Rather than use the 1,000-grit stone, which is soft and dishes quickly, use 400-grit sandpaper spray-mounted to a flat surface like plate glass or granite. Once the mill marks are gone, move to 600-grit sandpaper, then on to the 4,000- and 8,000-grit stones.

With the back flat and polished, the bevel is next. Most bench chisels come with a bevel ground to 25° or 30°. To avoid having to remove too much material, I hone at a steeper angle, 35°, so that just the tip of the blade is in contact with the stone. To maintain a consistent angle and avoid rounding the edge, I mount the blade in a side-clamping honing guide available for under $20 from any woodworking catalog. For tough-to-clamp chisels, try the narrow-blade honing guide from Veritas (see p. 17). Set the angle of the blade with a protractor or digital angle gauge. To make setup easier the next time, mark the amount of blade projection on a scrap of wood and keep it near your stones.

Start on the 1,000-grit stone, as shown in the photos, then move on to progressively finer stones. The last step is to flip the chisel and polish the back to remove the burr. After a few honings, the polished portion of the bevel will become too wide (more than 1/16 in.). When that happens, you'll need to regrind it at the original bevel angle using coarse sandpaper or a grinding wheel.



Flatten the back first. *Start on the 4,000-grit stone, working across the surface of the stone to keep from dishing it out. Only the area adjacent to the edge of the chisel needs to be polished, so don't waste time trying to polish the entire back. Rest just an inch or so of the blade on the stone and keep it dead-flat to the stone as you polish (left). When the back shows an even scratch pattern (right), repeat the process on the 8,000-grit stone for a final polish.*

A honing guide helps with the bevel. *Mount the chisel at 35° to hone a thin bevel. Start on the 1,000-grit stone, working on the backstroke (left) to avoid gouging the stone. Once you have a continuous line of polish (right), move progressively through the finer grits, finishing on the 8,000-grit stone.*

Remove the burr and get to work. *Finally, flip the chisel and polish the back on the 8,000-grit stone to remove any burr caused by working the bevel. Paring the end grain on a piece of pine is a good test to see how sharp you are (right). A thin shaving and a glass-smooth surface means you've done well.*

One-of-a-kind pulls

CAST CUSTOM HARDWARE FROM ANY OBJECT

BY SCOTT GROVE

When I got tired of the stock items available in stores and catalogs, I discovered cold metal-resin casting. Today, I use it to create distinctive cabinet pulls, finials, inlay, and even small boxes.

Casting is as easy as baking a cake, and the beauty of this technique is that you can make a master pattern from almost anything, from a hand-sculpted piece of wood to a found object like a pinecone. With the addition of clay, the possibilities are truly endless. And you can do it all for less than $5 apiece.

The casting material is a mix of metal powder and resin that has the feel and durability of real metal, with the look of bronze, steel, copper, etc.

I'll cover the basic concepts as I cast a pinecone pull. But this is just a small sample of what you can do. Once you have the process down, let your imagination run wild.

Before and after. *Grove makes a master (top) out of a found object like a pinecone or makes one out of wood, in this case adding beads and bark for a beautiful effect. He then uses the master to make a mold, which is used to create the final castings (bottom) from a mix of resin and metal powder.*

What you can cast, and what you can't

The master is the original object or model that a mold is taken from. This is what your casting will look like—exactly—including pores, wrinkles, and even wood grain.

The master doesn't have to be a durable object; it only has to be strong enough for a mold to be taken. So you can use hot-melt glue, clay, or whatever works to create a temporary

WHAT YOU NEED

There are a host of supplies for casting, but these are among the easiest to use for small pieces like furniture pulls. All are available from Smooth-On.com.

SILICONE MOLD MATERIAL
Mold Star 16 Fast
Trial unit (2 lb.), $30

URETHANE CASTING MATERIAL
Smooth-Cast Onyx Slow
Trial size (2.2 lb.), $25

METAL POWDER
Bronze powder (brass, copper, aluminum, and nickel-silver also available)
1 lb., $26

Photos, this page: Michael Pekovich

MAKE A MASTER...

A found object like this pinecone makes a beautiful custom pull, but only after a few steps are taken.

Fill deep crevices. *This will make the mold easier to remove. Use sulfur-free modeling clay and wipe off the excess with petroleum jelly.*

Add a mounting post. *Again, clay works well and can be textured with modeling tools. This mounting post will double as the pour spout for the casting process.*

Add a vent if needed. *The stem of the pinecone will point upward during the casting process, trapping an air bubble. A thin dowel, supported by more clay and attached with hot-melt glue, provides an air vent.*

assemblage. Everyday oil-based clays contain sulfur, which inhibits the curing process of some mold compounds. So I use sulfur-free clay, available from art-supply stores and casting suppliers. And I use vinyl gloves, as latex also can inhibit curing.

Thin areas and minimal contact points are a potential area of failure. For example, if you place a marble on a flat surface with the goal of combining the two, there will be a very small point of contact between them, and the little sphere will break off. But it is easy to use clay to beef up the weak point.

As you plan, you must also think about how the object will be mounted. The easiest approach is to incorporate areas or elements that will be drilled and tapped for screws and bolts. For this, you need enough meat at the attachment point, for example, at least ⅜ in. of material to support a No. 8-32 bolt.

Plan for the pour

Before you can call your master complete, you need to think past making the mold to when you flip the mold over and make a casting. Start by determining where the pouring spout or spouts will be. It should go on the back side of the item, in an unseen or less-seen area. On pulls, I often use the attachment points as spouts.

Not every casting will release all of its air bubbles out of a single spout, so air vents

...THEN USE IT TO MAKE A MOLD

A yogurt container works great for a small 3-D object, while melamine boxes can be made for flatter objects. Attach the master to the bottom with hot-melt glue.

Mix and pour. *Mix the two-part mold material thoroughly, and pour it into one spot on the bottom of the container, never on the object itself. Tap the sides to release bubbles. A line in the cup marks the best place to cut the mold open later.*

Strategic cuts. *Grove made cuts at both ends of the pinecone with a long razor knife, feeling for the vent dowel at one end and the surface of the pinecone at the other, and cutting down only as far as necessary to extract the object.*

Photos, except where noted: Asa Christiana

CASTING A PULL

A rubber band will re-close round molds, while rectangular ones can be clamped lightly. Do a first casting without metal powder to reveal any problems and extract debris from the mold. Add metal powder for subsequent castings.

Dust and shake. *Dusting the mold with metal powder ensures that the metal color will be even on the outside of the casting. Cover the spout and vents, and shake to coat all surfaces. Then shake out the excess powder.*

Add the metal powder. *Mix up the two-part urethane and then mix in the metal powder. Don't go thicker than the consistency of honey. Pour in the mixture slowly and steadily.*

may be needed. These are easy to make, usually by attaching a wooden dowel to the master.

Making a mold

While there is a wide variety of molding material to choose from, I recommend Smooth-On's Mold Star 16 Fast, which has a low viscosity so it pours and releases bubbles easily. Also, it is very flexible so molds are easy to remove. The "Fast" means it offers 6 minutes of working time—perfect for small items like hardware—and takes only 30 minutes to cure.

The first step in making a mold is mounting your master into a "mold box." Typically, I mount it with the pour spout and vent pointing down, using these ports to suspend the master in the middle of the box so it will be completely encompassed by the

ADD FINISHING TOUCHES

Easy out. *The pliable silicone mold material makes it easy to remove castings.*

Trim the casting. *The urethane resin can be worked like wood. Grove sawed off the vent, trimmed off the paper-thin flashing at the seams, sawed off some of the base, and then flattened it on a disk sander.*

Drill and tap. *The castings can be drilled and tapped easily for common bolt sizes.*

compound. Leave at least ½ in. of space on all sides and on top. This mold box can be simple, like a plastic cup or a plywood or melamine box.

If you make a box, seal the inside corners with clay, caulk, or hot-melt glue so the compound won't leak out. Also, I fasten the master to the bottom of the box with hot-melt glue so it won't move or float.

To avoid mixing up too much mold compound and wasting it, I do some simple math to calculate the volume of the container. You can also pour water in and pour it out to measure.

The casting process

For small parts like the ones seen here, I use a two-part urethane resin called Smooth-Cast Onyx Slow, also made by Smooth-On. It allows 5 minutes of working time, and cures hard in 90 minutes. I use the black color (onyx) for the darker metal powders, such as bronze, copper, and brass, but a white variety for lighter metal powders such as aluminum and nickel-silver.

Before I make my first metal casting, I always do a preliminary one with the urethane resin only, to test the quality of the mold and clean out any residue. This also helps to check for seam alignment and vent performance. If you discover an area of air entrapment, a vent can be drilled through the mold after the fact, so don't worry. □

Scott Grove designs and makes furniture in Canandaigua, N.Y., and teaches widely.

Online Extra

To see more tips and tricks for metal-resin casting, go to **FineWoodworking.com/extras.**

Burnish and add depth. *Burnish with steel wool to reveal the metal, and then wipe dark shoe polish or black wax into the cracks and crevices to add depth and detail.*

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how they did it

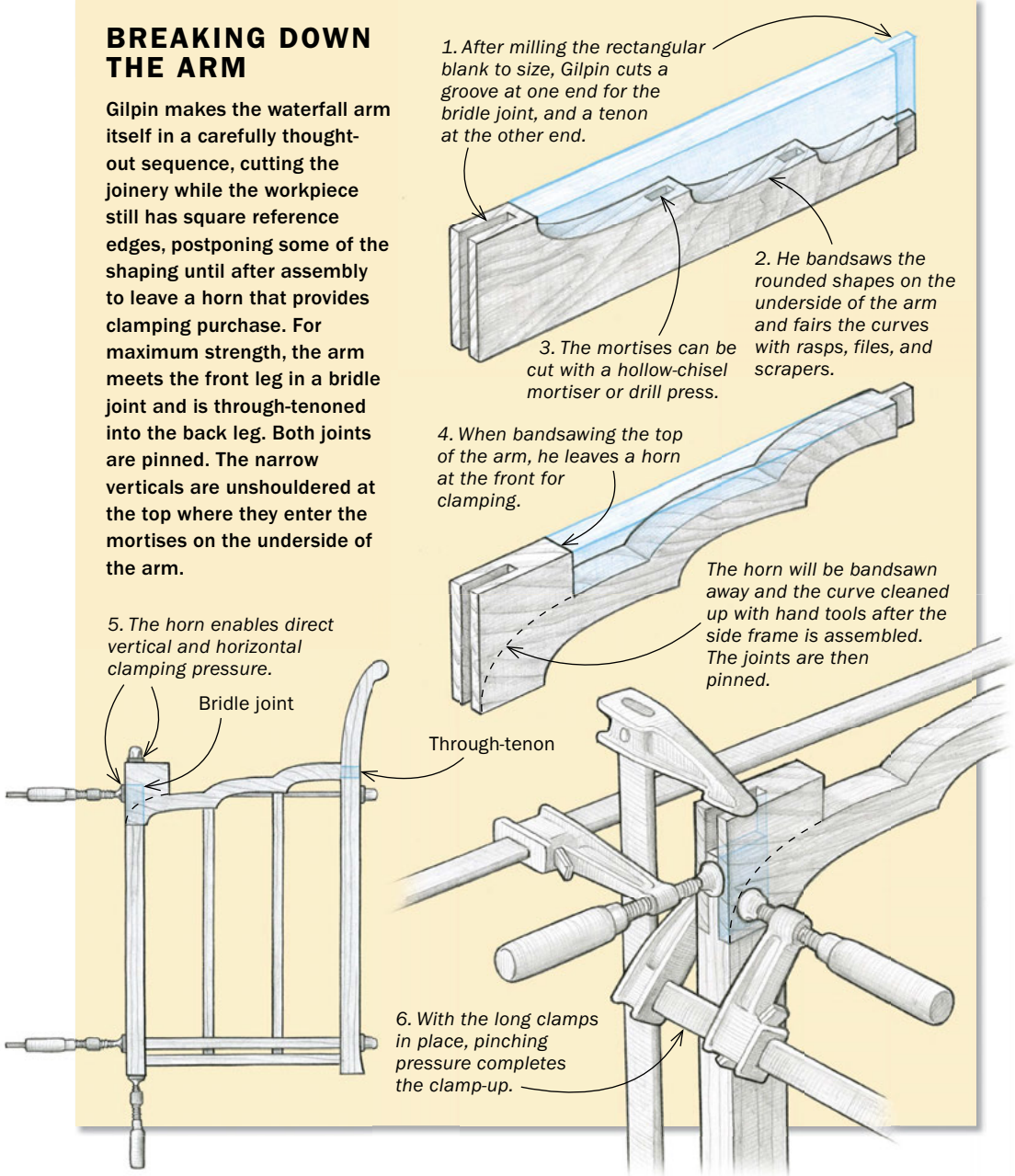
A wooden waterfall

BY JONATHAN BINZEN

Hank Gilpin's first waterfall armchair (see the back cover) spawned a series of related designs. Building in sets of 2, 4, 12, and even 24, he has made more than 80 of them. The signature arm—"the triple-blip arm," as he calls it—is cut from a rectangular blank and joins the back leg, front leg, and low side stretchers to form a flat frame. Gilpin borrowed this approach from a chair by Duncan Phyfe, and it makes his chair far easier to build. He first glues up the two side frames, then joins them with the seat rails and crest rail. The strength of the side frames also allows him to dispense with side seat rails, leaving the vertical lines unbroken.

BREAKING DOWN THE ARM

Gilpin makes the waterfall arm itself in a carefully thought-out sequence, cutting the joinery while the workpiece still has square reference edges, postponing some of the shaping until after assembly to leave a horn that provides clamping purchase. For maximum strength, the arm meets the front leg in a bridle joint and is through-tenoned into the back leg. Both joints are pinned. The narrow verticals are unshouldered at the top where they enter the mortises on the underside of the arm.



EVOLUTION OF A CHAIR

The arm in Gilpin's original chair, designed for visual impact and meant to fit partway beneath a desk, didn't provide adequate support for a sitter's forearm.

To address that issue, he next made a two-level arm where the upper level presented a long, flat surface. He also replaced the original splat with a resilient slatted back.

In the most recent version, seen here in spalted maple, the overall structure is the same, but the arm is S-shaped for even more comfort, and the back is a slat-splat hybrid.

Drawings: John Tetreault; photos: Jonathan Binzen

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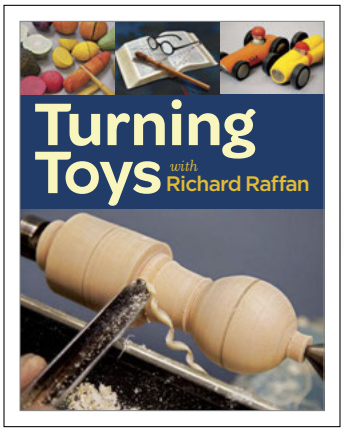

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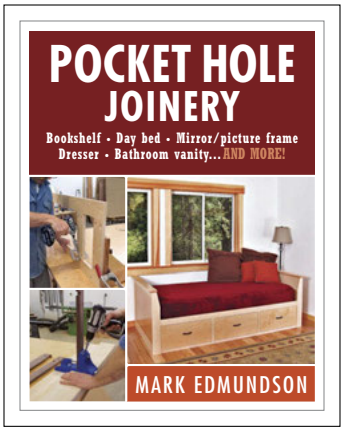

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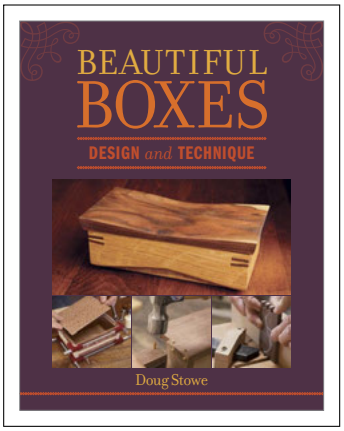

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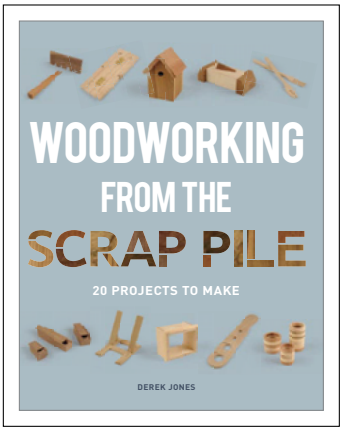

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Cascade

Constraints would seem to be the foe of self-expression. But for Hank Gilpin, they're an essential spur to creativity—a thumb over the end of a garden hose turning a lazy stream into a geyser. Gilpin designed this waterfall armchair in 1983 when a customer came to him with an unusual request: a chair less for sitting in than for looking at. It would fit just partway under a desk in the entrance hall and be seen in side view from across the living room. Gilpin began thinking. It was early in his career, and he was steeped in all sorts of furniture—English Arts and Crafts, Queen Anne, Greene and Greene, Classical Chinese, Mackintosh, Duncan Phyfe. As he made sketch after sketch for the chair, focusing on the side elevation, all those influences were blending and percolating on the page. Somewhat magically, as the design came together and all those inspiring furniture forms squeezed through the narrows of one customer's request, what cascaded forth was a pure expression of Gilpin's own distinctive style.

—Jonathan Binzen

Photo: Jonathan Binzen

How They Did It Turn to p. 90 to see how Gilpin's waterfall armchair has evolved through the years.

Listen to Gilpin discuss his range of work in an exclusive audio slide show.